# FT-111

**Weighing Indicator** 

# **User Manual**



Flintec www.flintec.com



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# **1 SAFETY INSTRUCTIONS**



**CAUTION:** READ this manual BEFORE operating or servicing this equipment. FOLLOW these instructions carefully. SAVE this manual for future reference. DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment. ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL Flintec for parts, information, and service.



**WARNING:** Only permit qualified personnel to service this equipment. Exercise care when making checks, tests and adjustments that must be made with power on. Failing to observe these precautions can result in bodily harm.



**WARNING:** For continued protection against shock hazard connect to properly grounded outlet only. Do not remove the ground prong.



**WARNING:** Disconnect all power to this unit before removing the fuse or servicing.



**WARNING:** Before connecting/disconnecting any internal electronic components or interconnecting wiring between electronic equipment always remove power and wait at least thirty (30) seconds before any connections or disconnections are made. Failure to observe these precautions could result in damage to or destruction of the equipment or bodily harm.



**CAUTION:** Observe precautions for handling electrostatic sensitive devices.

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## 2 Introduction

# 2.1 OVERVIEW

FT-111 Weighing Terminal is an economical and powerful state-of-the-art measuring instrument. It is ideal for industrial weighing applications like basic weighing, labelling, system control with digital outputs, fieldbus interfacing, etc. Its set values memory with 500 items record size which each item has 5 pieces limit values gives big advantage in operation.

Digital inputs and outputs of the instrument can be programmed as a Remote IO on the fieldbus. This feature gives advantage to eliminate additional PLC in the cabinet for only having remote IO's.

The scales equipped with FT-111 weighing terminal can be used in all kinds of industrial areas up to harsh, wet, and hygienic environments with its fast and efficient cleaning that was designed and built according to the international guidelines.

#### 2.2 SPECIFICATIONS

Analogue Load cell			
A/D converter type	24 bit Delta-Sigma ratio metric with integral analogue and digital filters		
Conversion rate	Up to 800 measurement values per second		
Input sensitivity	0,4 $\mu$ V/e approved, 0.05 $\mu$ V/e non approved.		
Analogue input range	-5 mV to +19 mV		
Internal resolution	up to 16 000 000		
Excitation	5 VDC max. 125 mA		
Number of load cells	Up to 8 load cells 350 $\Omega$ or 25 load cells 1100 $\Omega$ .		
Connection	4- or 6-wire technique.  Connection Home cable length: maximum 1000 m/mm² for 6-wire connection between FT-111 and junction box.		
Scale			
Range	Single range, up to 3 x multi-intervals, up to 3 x multi ranges.		
Display resolution	Approval, up to 10 000 division at usage in trade, according to EN45501 and OIML R76. Up to 999 999 division at industrial usage.		
Platform	Every kind of platform which is equipped with strain gage-based load cells.		
Calibration and Functions			
Calibration	Calibration with test weights, eCal electronic calibration without test weights, Temporary zero calibration, Zero adjustment, Gain adjustment, Coefficient entry.		
Digital filter	5 steps programmable adaptive filter		
Average filter	Programmable dynamic filter		
Weighing functions	Taring, zeroing, auto zero tracking, motion detection, auto zero at power up, tare status saves at power off, increased resolution, automatic tare and clear, temporary gross indication, unit change.		
Standard applications	Labelling with barcode, free set points, functional digital outputs, livestock weighing, Remote IO of PLC or HMI, fieldbus interface.		

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Memo	Memory			
Applic	Application memories  Set Memory to save limit values at your industrial weighing.  Memory size is 500 item records.			
Alibi n	nemory (optional)	99 999 records		
Comm	nunication			
Conne	ectable with	PC, PLC, Printer, Remote display, EPL printer etc.		
	Port	2 pieces opto-isolated, 3 wire.		
232	Baud rate	1200 to 57600 programmable		
RS 2	Data	Length 7 or 8 bits; parity even, odd or none		
	Baud rate	1200 to 57600 programmable		
485	Data	Length 7 or 8 bits; parity even, odd or none		
RS 4	Stations	Up to 31 stations		
	Transmission rate	10 / 100 Mbit/s, Full duplex		
۵	TCP/IP settings	Manual IP assign over EtherX PC Software or by keys in programming mode.		
Ethernet TCP/IP	Connection method	Server or Client		
herne	Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45.		
显	Isolation	Galvanically isolated bus electronics		
	Response speed	Max. 4 ms response delay after read/write commands		
	Connection	Standard USB Mini-B cable		
USB	Response speed	Max. 4 ms response delay after read/write commands		
Digita	Digital Inputs and Outputs (optional)			
Digital Inputs C		Opto-isolated 4 digital input, 12 to 28 VDC, 10mA		
Digita	l Outputs	5 free relay contact, 250 VAC or 30 VDC, 0.2A		
Analo	gue Output (optional			
Voltag	ge output	0-5 VDC, 0-10 VDC		
Currer	nt output	4-20mA, 0-20mA		
Resolu	ution	60 000 steps between minimum and maximum output.		
Max. cable length		300 meters		
Max. load resistance (current output)		500 Ω		
	oad resistance ge output)	10 kΩ		
Profibus DPV1 (optional)				
Data r	ate	Up to 12000 kbit/s with automatic baud rate detection		
GSD fi	le	Generic GSD-file provided		
Topology		Depending on physical media RS-485: segmented line topology without stubs		

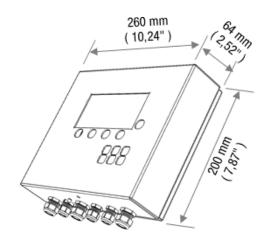
Installations	Shielded twisted pair cable Line length depending on physical media and transmission speed		
Max. Stations	up to 126 stations per network		
Isolation	Galvanically isolated bus electronics		
Response speed	Min. 4 ms response delay after read/write commands		
Profinet (optional)			
Data rate	100 Mbit/s, full duplex		
GSDML file	Generic GSDML-file provided		
TCP/IP settings	DHCP or manual IP are assigned over EtherX PC Software or by keys in programming mode. Device identity customization		
Topology	Line, Bus, Star or Tree topology depending on physical media		
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.		
Web client	Available		
Isolation	Galvanically isolated bus electronics		
Response speed	Min. 4 ms response delay after read/write commands		
EtherNet/IP (optional)			
Data rate	10 Mbit/s or 100 Mbit/s, full duplex		
EDS file	Generic EDS-file provided		
DLR (Device Level Ring)	Available		
TCP/IP settings	DHCP or manual IP assign over EtherX PC Software or by keys in programming mode. Device identity customization		
Topology	Line, Bus, Star or Tree topology depending on physical media		
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.		
Web client	Available		
Isolation	Galvanically isolated bus electronics		
Response speed	Up to 4 ms. response delay after read/write commands.		
EtherCAT (optional)	EtherCAT (optional)		
Data rate	100 Mbit/s, full duplex		
ESI file	Generic ESI-file provided		
Topology	Line, Tree, Star or Daisy-chain topology depending on physical media		
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.		
Isolation	Galvanically isolated bus electronics		
Response speed	Up to 4 ms. response delay after read/write commands.		

CC-Link (optional)		
Data rate	156 kbit/s – 10 Mbit/s (selectable)	
Topology	Line with Trunkline, Branch structure and Termination at both Ends.	
Installation	3 wires shielded twisted pair cable.	
Max. Stations	Up to 64 stations per network	
Isolation	Galvanically isolated bus electronics	
Response speed	Up to 4 ms. response delay after read/write commands	
Powerlink (optional)		
Compatibility	Supports Ethernet POWERLINK V2.0 Communication Profile Specification version 1.2.0	
Data rate	100 Mbit/s, half duplex	
XDD file	XDD-file provided	
Ring redundancy	Available	
Topology	100% free choice of star, tree, ring or daisy chain	
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.	
Isolation	Galvanically isolated bus electronics	
Response speed	Min. 4 ms response delay after read/write commands	

Power Consumption				
	100 – 240 VAC, 50 – 60 Hz max. 25 mA + max. 50 mA for fieldbus interfacing OR 12 – 28 VDC 250 mA + max. 500 mA for fieldbus interfacing			
Environment and Enclosure	2:			
Operation temp. range	Operation temp. range  Approved scales -10 °C to +40 °C Industrial usage -15 °C to +55 °C			
Humidity	Approved scales 80% RH max, non-condensing 90% RH max, non-condensing			
Enclosure	Stainless steel			
Protection	IP67			
Sizes ( W x H x D )	Wall type : 260 x 200 x 64 mm (10,24 x 7,87 x 2,52")			
Weight	2,3 kg (5,07 lb)			
Packing sizes	29 x 28 x 21 cm (11,42 x 11,02 x 8,27")			
Weight packed	3,2 kg (7,05 lb)			

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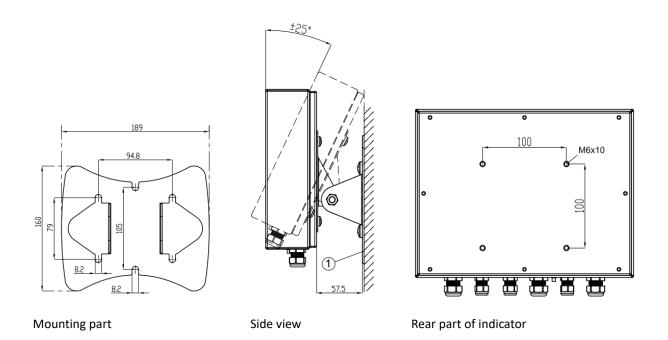
# 2.3 Housing



# 2.4 MOUNTING KITS

# Wall mounting kit

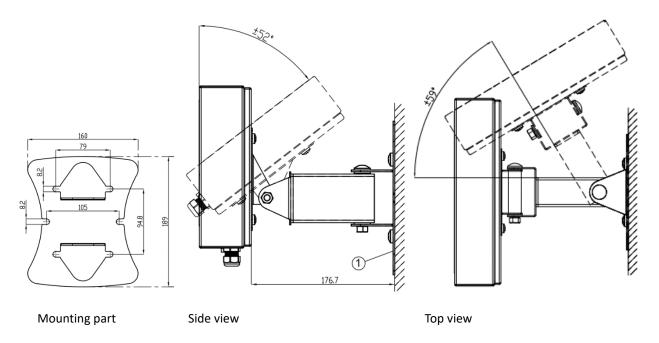
This kit can be used to install the weighing terminal on to the desk or to the wall. Its mounting dimensions and adjustment angles are shown below.



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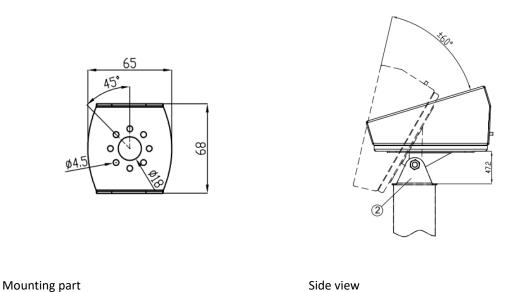
## 2D Wall mounting kit

This kit can be used to install the weighing terminal on to the wall. 2D wall mounting kit provides to adjust the angles of the terminal at two directions. Its mounting dimensions and adjustment angles are shown below.



# **Column mounting kit**

This kit can be used to install the weighing terminal on to the column of the platform. Its mounting dimensions and adjustment angles are shown below.



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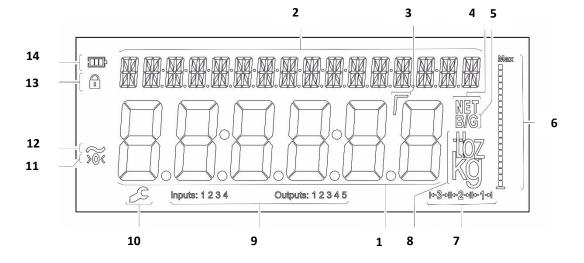
# **3** THE FRONT VIEW AND KEY FUNCTIONS



Figure 3.1 – Front view of FT-111

# 3.1 DISPLAY

The bright and wide-angle LCD display of the FT-111 is shown below.



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# The meanings of the announcement symbols on the display are:

1	8	6-digit 22 mm height big weighing display with sign
2	M	16-digit 8 mm height alphanumeric information display
3	Γ	High resolution digit separator.
4	NET	Announces the indicated value is the net weight.
5	B/G	Announces the indicated value is the gross weight.
6	Max	Bar graph
7	<b>⊬3→⊮-2→⊮-1→</b>	Indicates the range of the scale at multi range and multi-interval operations.
8	kg	g, oz, kg, t, lb units are located on the right of the display.
9	Inputs: Outputs:	Announces the activated inputs and outputs.
10	2	Announces the instrument is at repair status or call service.
11	>0<	Announces the weight value is in the centre of zero range.
12	~	Announces the weighing is not stable. After stabilization of the weighing, this symbol disappears.
13	•	Announces the keys are locked.
14	<b></b>	Announces the battery charging level.

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# 3.2 KEYPAD

The keys and the key functions of FT-111 in usage are:

The Reys and	l	I
ON/OFF	On: Press the key to switch on the weighing terminal. Off: Press the key more than 2 seconds to switch off the instrument.	Page 27
(L)	Date & Time: This key used to indicate date and time on the alphanumeric display.	Page 29, 56
G/N↓	<b>Temp. Gross in Net:</b> This key is used to indicate the Gross weight temporarily in net mode.	
SP †	SET value entry: Press this key to enter set points.	Page 32, 58
C ÷	<b>Print:</b> By pressing this key weight data transferred to a printer or to PC.	Page 28, 39
\$) † †	Navigation keys: Date, G/N, SP and Print keys have navigation functions in the set point memory and in the programming.  The meanings of the symbols on keys at usage are;  Return. Increase the blanking digit or next step. Decrease the blanking digit or previous step Change the item or enter into parameter.  Save the data after entry. Go to the next parameter.	Page 42
Esc 🚣	Unit change key: This key is used to change unit. The unit change is available between kg and lb, and between g and oz.  Esc: The second function of this key is escape. Press the key to escape from any entry or step in operation.	Page 28, 61
M	High resolution key: This key is used to indicate 10 times higher resolution of the weight value.  Memory: The second function of the key is memory transactions. Press for more than 2 seconds to enter memory. Or press this key to load any item from memory in Set point entry step.	Page 28, 60, 37
··•	Tare: Press this key for taring the scale.  Key lock: This key is used to lock/unlock the keys.	Page 28, 55, 29, 57
→0←	<b>Zeroing:</b> If the unloaded scale doesn't show zero at gross operation, press this key to compensate zero drift.	Page 27, 61
CLEAR * *	Clear: Clears the tare and indication returns to the gross value.  Plus/Minus: This key is used to set negative set point value.	Page 28, 37
ENTER 4	Enter: Save the data and go to the next step.  Print: By pressing this key the weight data is transferred to a printer or to a PC.	Page 42, 39

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# 4 Installation

**PRECAUTION**: Read this section carefully before installation of the instrument. Applying the recommendations in this section will increase your system reliability and its long-term performance.

#### 4.1 RECOMMENDATIONS

#### 4.1.1 Environment

The weighing terminal should be placed in an area which is clean, not getting direct sun light if possible, having a temperature between -15 °C and +55 °C and humidity not exceeding 80% non-condensing. All external cables should be installed safely to avoid mechanical damages.

This instrument is very low-level signal measuring instrument. To avoid electrical noise, it should be separated from equipment that produce electrical noise. The instrument body must be connected to the good ground against the electromagnetic disturbances. Load cell cable must be separated from other cables especially from power cables if possible. If there are electrical noise-generating equipment such as heavy load switches, motor control equipment, inductive loads etc., please pay attention against the EMC interference and take all the prevention. Connect parallel reverse diodes to the DC inductive loads like relays, solenoids etc. to minimize voltage peaks on the DC power lines.

#### 4.1.2 Mechanical Installation Recommendations

You may install your weighing indicator on a column, on a table or on a wall. Take care of the housing drawings and dimensions given in this manual to design your weighing scale or weighing station mechanically.

# 4.1.3 Cabling Recommendations

All cables coming to the instrument must be of high quality and shielded. Distance from load cell cables, interface cables and DC power supply cables to power line cables must be minimum 50 cm. The separate cable tray usage for these low signal level cables is strongly recommended.

For cable connections of different thicknesses, as seen in Figure 4.1 there are 3 interlocking gaskets with different diameters, indicated as B, C, and D, inside the glands used in the FT-111 weighing terminal. Depending on the thickness of the cable, remove the gaskets B and C respectively, pass the cable through the gland and tighten it. In this way, wires ranging in thickness from 4 to 8 mm can be easily connected to the terminal using the same gland with the appropriate sealing combination.

To maintain the immunity of the device against electromagnetic interference, the cable shields should be connected to the grounding pins inside the device, shown in Figure 4.2.



Figure 4.1- Seal combination and mounting of gland assembly Figure 4.2 - Ground pins in FT-111 for cable shield grounding



**Warning**: Incorrectly closed back cover and poorly tightened glands may be unwanted results with loss of IP rating and safety. Tighten the glands' cup nut with minimum 5Nm torque.

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# 4.1.4 Electrical Connection Recommendations

- 1. Always remember that FT-111 terminal is very low voltage measuring instrument used in the industrial environment. Your proper installation increases the reliability and performance of the instrument.
- 2. Only a trained person should interface the instrument due of the 230 VAC voltage in the instrument and against malfunction at installation.
- 3. If the energy condition of your plant is not good enough, prepare a special power line.
- 4. The quality of your plant grounding will provide weighing accuracy and the safety of FT-111. If grounding of your plant is not good enough, prepare a special power line and grounding.
- 5. Power off the instrument before connecting or disconnecting any peripheral instrument.
- 6. The shielded cable and ground connection of the shield will increase the immunity of FT-111 against electrical disturbances. Shields of cables should be connected to the grounding pins in FT-111.
- 7. All required electrical connections should be done as described in the installation section, page 17. If you need to service the terminal, turn the power off and wait at least 30 seconds before opening housing.

#### **Location of the Peripheral Connections**

The electrical terminals of the main board are shown in the 2 pictures below.

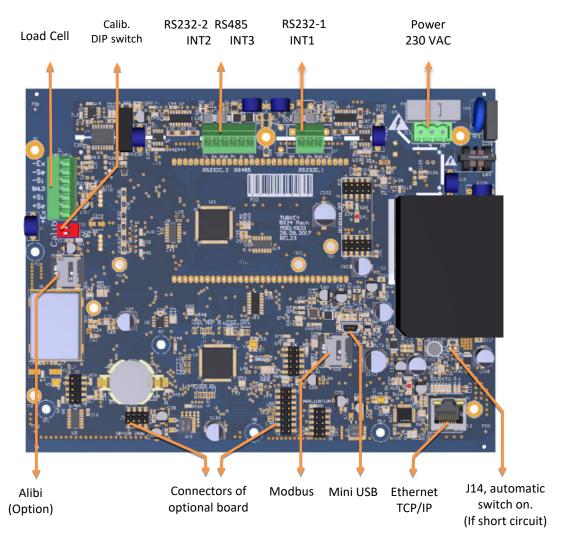


Figure 4.3 - FT-111 main board

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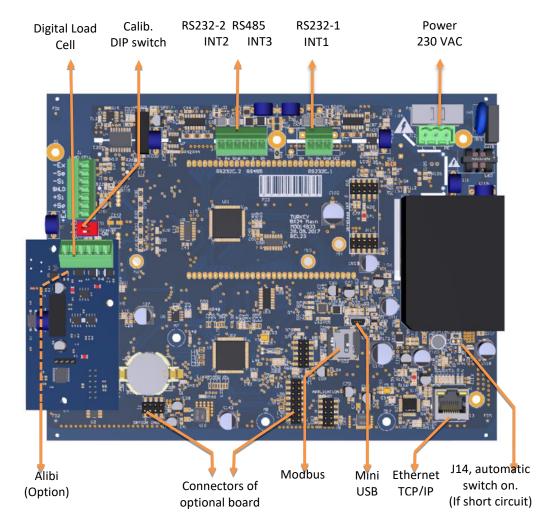


Figure 4.4 - FT-111D main board

# 4.2 INSTALLATION STEPS

Follow the steps below carefully to install the instrument.

#### **Step 1: Preliminary Preparations**

Before starting the installation,

- 1. Select the weighing terminal location. Refer to recommendations in the previous section.
- 2. Prepare the Protective Earth (PE) cable to grounding the FT-111 housing. The protective earth should be as good as possible for scale reliability.
- 3. Prepare the required power source near the weighing terminal.
- 4. Prepare the cabling tray, pipe etc. from platform to the weighing terminal.

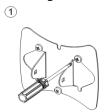
#### Step 2: Mechanical Installation

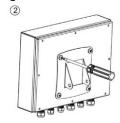
Be sure that the mechanical installation of the instrument is done properly for long time operation life and suitable for the electrical installation as descripted below. Installations of wall type housings are identical due to same kits' usage as shown below.

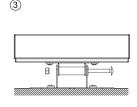
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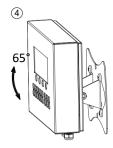
#### Wall mounting

Dismounting the wall mounting kit before installation and follow the steps below.









Install the wall mounting part of the kit to the wall with 3 screws.

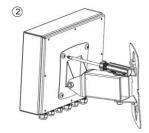
Install the holder of the kit to the rear the instrument with 4 pcs M5 x 15 mm screws.

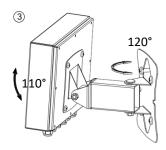
Reassemble the wall mounting kit as seen in the picture.

Adjust the angle of weighing terminal.

#### Wall mounting with 2D kit







Install the mounting kit to the wall with 4 pcs screws.

Install the mounting kit to the rear of the instrument with 4 pcs M5 x 15 mm screws.

Adjust the weighing terminal's direction and angle.

#### **Column mounting**

Dismount the column mounting kit before installation and follow the steps below.







Install the small part of the kit to the column.

Assemble the kit as seen in the picture.

Install the weighing terminal to the kit with 4 pcs M5 x 15 mm screws.

#### Step 3: Open the Housing / Close the housing

Be sure that the mechanical installation of the instruments is done properly, and environment is convenient to open the housing.

Open the housing from its rear. The rear part of the housing will be hanged to two stainless steel wires connected to body.

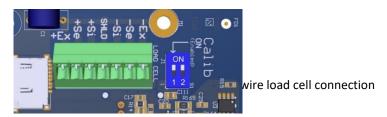
**Warning:** Incorrectly closed cover and poorly tightened glands may be unwanted result with loss of IP rating and safety. Close the cover's bolts with minimum 1.5 Nm torque.

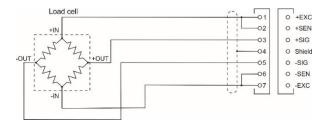
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#### Step 4a: Analogue Load Cell Connection

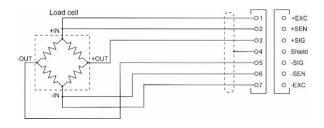
To avoid damages, the load cell wiring should be made carefully before energizing the instrument. Load cell connection detail is shown in Figure 4.6. In 4-wire installations the sense and excitation pins with the same polarity **should be short circuited** at the connector side. If you have junction box in your system, use 6 wire cable between FT-111 and the junction box, and short circuit these pins at junction box for better performance.

Figure 4.5- Analogue load cell terminal





6 wire load cell connection



Junction box connection
Wiring between instrument and
junction box will be 6 wire.

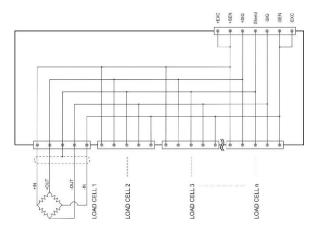


Figure 4.6 – Analogue load cell and junction box connection

**Warning:** Always connect Sense pins to Excitation pins for 4 wire connection. Non-connected sense pins may cause the wrong Excitation voltage measurement and create an accuracy and instability problem.

**Warning:** Connect the load cell cable shield to the housing (recommended to increase the EMC immunity against disturbances) or shield pin of the load cell connector.

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#### Step 4b: Digital Load Cell Connection (Only FT-111 D)

The digital load cell wiring should be made carefully before energizing to avoid FT-111D and load cells from damages. The instrument cable between the instrument, LPK24 Lightning protection kit and junction box must be shielded and convenient for high speed RS485 interface. The wire diameter of the instrument cable should be selected for maximum 0,5 volt drop between Junction box and LPK24 lightening protection kit.

CO	Pin number (J2)	Definition	Description
275 10 10 10 10 10 10 10 10 10 10 10 10 10	1	А	+ RS485 for DLC interfacing
	2	В	- RS485 for DLC interfacing
8 0 0 0 0 0 20 228 20 228 27 228 27 27 28 27 28 27 28 27 28 27 28 27 28 27 28 27 28 27 28 27 28 28 28 28 28 28 28 28 28 28 28 28 28	3	Gnd	Ground
LA R God Di Do DE	4	P <sub>in</sub>	Power input (from LPK24)
A B Gnd Pi Po PE	5	Pout	Power output (to load cells via LPK24)
	6	PE	Protective Earth

Table 4.1 – Pin configuration of the digital load cell board's terminal

#### **Imported Note:**

Since the supply voltage of the digital load cell is isolated, its Ground (0 VDC) should NOT be connected to another ground or PE-Protective Earth!!!

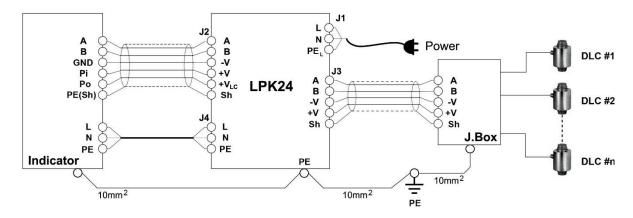


Figure 4.7 – FT-111D, LPK24 and DLC connection with junction box

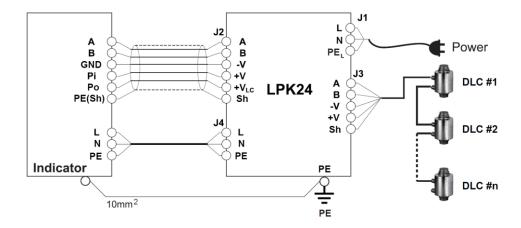


Figure 4.8 – FT-111D, LPK24 and DLC connection without junction box

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#### Step 5: RS 232C Serial Ports

FT-111 weighing terminal has 2 x RS232C serial ports on the main board which are galvanically isolated from other circuitry to increase the EMC immunity. RS232C serial ports are named as RS232C-1 and RS232C-2 in set up menu and as Int 1 and Int 2 on the electronic board. The use of these serial ports and specifications are described in the Table 4-2 and their pin configuration is shown in Table 4-3

Usage	Interfacing with printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol, or Modbus RTU
Baud rate	1200 / 2400 / 4800 / 9600 (Default) / 19200 / 38400 / 57600 bps
Length	7 or 8 (default) bits
Parity	Even, Odd or No (default)
Start / Stop bits	1 start bit and 1 stop bit

Table 4-2 - RS 232C Serial Interface Specifications

- · · · ·	RS232- 1	RS232-2
Definition	Pin number (Terminal J7)	Pin number (Terminal J4)
TXD	2	1
RXD	3	2
GND	4	3

Table 4-3 - Pin configuration of RS 232C terminals

**2 wire connection to peripherals:** RS 232C serial connection is done with two wires as indicated below in Figure 4.9. if there is no data entry to the weighing terminal. Typical applications are printer and remote display connections.

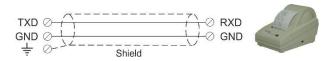


Figure 4.9 – 2 wire RS 232C connection with a printer or PC

**3 wire connection to the peripherals:** RS 232C serial connection is done with three wires as indicated below in Figure 4.10 for bidirectional interfacing. Typical application is bidirectional BSI format interfacing with PC or PLC.

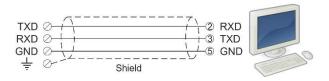


Figure 4.10 – 3 wire RS 232C connection with a PC or PLC

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#### Step 6: RS 485 Serial Port

FT-111 weighing terminal has a RS485 serial port on the main board. The use of this galvanically isolated serial port and its specifications are described in the Table 4-4 and its pin configuration is shown in Table 4-5. RS485 serial port is named as Int 3 on the main board. Refer to page 38 to configure RS485 serial port and page 38 for details on data formats.

Remember 120-ohm line termination resistors should be installed on both ends of the RS 485 line.

Usage	Interfacing with printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol or Modbus RTU.
Baud rate	1200 / 2400 / 4800 / 9600 (Default) / 19200 / 38400 / 57600 bps
Length	7 or 8 (default) bits
Parity	Even, Odd or No (default)
Start / Stop bits	1 start bit and 1 stop bit
Address	Programmable between 01 99
Max quantity	Maximum 31 instruments on the line.
Cable length	Maximum 1000m.

Table 4-4 - RS485 Serial Interface Specifications

Definition	RS485
	Pin number (Terminal J4
Α	4
В	5
Shield	6

Table 4-5 – Pin configuration of RS 485 terminal

RS485 serial connection is done with two wires as indicated below in

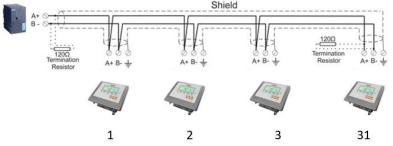


Figure 4.11 – Multi instrument connection with PLC

#### Step 7: Ethernet TCP/IP

The usage of the Ethernet port on the main PCB and its data formats are shown in the Table 4-6 and its pin configuration is shown in Table 4-7. Refer to Section 8 of the manual to configure this interface. Use the RJ45 connecter with metal body and connect shield of the Ethernet cable to the metal body of the connector.

Usage	Interfacing with Printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol, Modbus TCP

Table 4-6 – Data formats of Ethernet port

Pin number (Terminal J13)	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data –
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data –
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Metal body of the RJ45 connector

Table 4-7 – Pin configuration of RJ45 Ethernet connector

The HUB connection cabling is a direct connection as shown below:

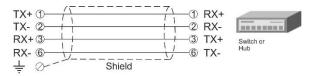


Figure 4.12 - HUB connection

The PC connection cabling is done via a cross cable as shown below. IP address blocks and gateway address of FT-111 and PC should be the same in cross connection.

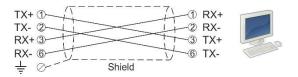


Figure 4.13 - PC connection with cross cable

Important note: Disconnect IndFace2x software before Ethernet interfacing.

## Step 8: USB Port

The usage of the on-board USB 2.0 and its specifications are shown in the Table 4-8. You need the mini-USB cable to connect the weighing terminal to the peripheral instrument. Refer to page 48 for USB port configuration.

Usage	Interfacing with PC via USB 2.0
Data formats	Continuous, Fast Continuous, BSI Protocol to PC near the instrument.

Table 4-8 - Data formats of the USB port



Figure 4.14 – Micro USB port connector

#### Step 9: Alibi Memory (option

If you install the alibi memory to the main board, order Alibi memory SD card from Flintec or dealer. The alibi memory SD card should be inserted into the SD1 card slot which is between load cell terminal and metal box of the analogue digital converter. Refer to page 76.

#### **Step 10: Optional Board Installation**

FT-111 has a free port to add digital inputs and outputs and fieldbus interfacing features to the instrument. You will find all data to install the optional peripheral on page 26.

#### **Step 11: Power Source Connection and Grounding**

The weighing instrument measures very low signal levels. The quality of the power line and grounding will determine the accuracy and the safety of your measuring system. The instrument should not share power lines with noise-generating parts such as heavy load switching relays, motor control equipment, inductive loads, etc. If the condition of the power supply in the plant is poor, prepare a special power line and grounding. Before connecting the power source check its voltage and be sure that it is the same with the voltage written on the weighing terminal.

	AC Power	DC Power
Pin number	(Terminal J12)	(Terminal J15)
1	L	+24 V
2	N	0
3	PE Protective Earth (Grounding) Minimum cross section area is 4mm <sup>2</sup>	

Table 4-9 – Pin configuration of power supply connector



Figure 4.15 – Power source connection and grounding

If the voltage is correct:

- 1. Connect the grounding wire to the grounding screw near glands on the housing of the instrument.
- 2. Connect grounding points of other instruments in the system to the FT-111 grounding screw in Figure 4.15 or directly to the system grounding point.

**Warning:** The instrument should be shielded. Connect the shield to the protective earth with a cable having a minimum of 4 mm  $^2$  cross section.

- 3. The 90 240 VAC supplied instruments are shipped with power cord. Prepare the power outlet for the instrument.
- 4. The 24 VDC supplied instruments are shipped with installed 2 meters power supply cable. Connect this cable to power supply as shown in Table 4-9
- 5. Energize the instrument after checking all electrical and grounding connections.

In case the power source is not proper, do not connect the scale to the power source and contact your authorized dealer.

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#### Step 12: Scale Setup and Calibration

**Warning:** You cannot change the legally related parameter values and calibration after sealing the instrument in legal usage. Be sure that you have done proper set up for your usage before sealing the scale.

The weighing terminal should be set up and calibrated according to your operation and application. Read this document carefully and select the parameter values which are convenient for your usage before programming the instrument.

- 1. Enable set up and calibration. Refer to section 8 in page 42
- 2. Set all parameters in setup menu. Save and exit. Refer to section 8.4 on page 43.
- 3. Perform corner adjustment.
- 4. Perform calibration. Refer to section 8.5 on page 44.
- 5. Test the scale accuracy and performance after calibrating the scale.
- 6. Test peripheral connections before start using the instrument in your system.

#### Step 13: Use

You may start to use the scale for weighing after setting it up and calibration. We recommend testing your peripheral interfaces before starting to use the scale in your application.

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#### 4.3 Installation of Optional Boards

This section describes the mechanical installation of optional interface boards which are digital Input/ output, analogue output, Profibus, Profinet, EtherNET/IP, EtherCAT, Powerlink, CC-Link, and CANopen. Follow the steps below at installation of the interface option board.

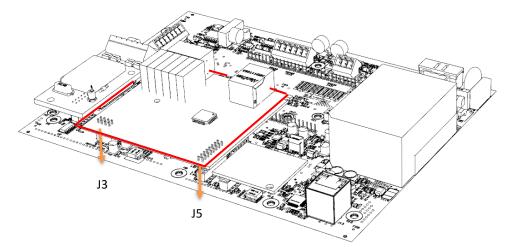


Figure 4.16 - The mechanical installation of optional board

- 1. De-energize the instrument, remove all the electrical connections, and carry it to the safe area. Option board must be installed in a safe area. After de-energizing the instrument wait 30 seconds to open it.
- 2. Remove the M3x6 mm screw at M7 connection point.
- 3. Install 11 mm spacer which is supplied together with option board to the M7 connection point.
- 4. Install 7 mm spacers which are supplied together with option board to the M6 and M10 connection points.
- 5. Install the option board to the J5 and J3 connectors carefully.
- 6. Mount the M3 x 6 mm screw to fix option board to the spacer.
- 7. If you need additional gland, Install Ex-gland which is supplied together with option board to instead of a blind plug.
- 8. Install cables to the option board as described in the related sections.

#### 4.4 CLEANING

Warning: Disconnect the instrument from power source before start cleaning for your safety. Cover the open glands.

FT-111 Weighing Terminal is designed for using in wet, hygienic, and harsh environment. To maintain the instrument, never use harsh abrasive cleaners or solvents. Wipe the instrument with a soft cloth slightly dampened with warm soapy water or with mild detergent. You may wash the instrument with washing machine, max. 10 litre/min and 20 kPa.

## 4.5 DISPOSAL

This device is in conformity with the WEEE Regulation harmonizing 2012/19/EU European Directive (WEEE). This device may not be disposed of with domestic waste. This rule also applies to the non-EU countries, according to their specific regulations. Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. For your questions, please contact the responsible local authority. Thank you for your attention to environmental protection.

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# **5 FT-111 FUNCTIONS**

#### **5.1** BASIC FUNCTIONS

#### Switching on

The instrument will be switched on after pressing the power on / off key. FT-111 will start weighing operation after announcing the model's name and software version, load date and display testing.

#### **Switching off**

The instrument will be switched off after pressing the power on / off key for more than 2 seconds. [ - OFF - ] message appears short time on the display before power off.

#### Zeroing

Zeroing corrects the drifts of the unloaded scale from the zero point.

- 1. Unload the scale.
- 2. Press +0+ kev.
- 3. Centre of zero symbol >0< appears on the display.
- 4. Check the centre of zero symbol on the left of the display. If it does not appear, press the for correct zeroing.

Zeroing is available in the limited range by zeroing parameter 514, page 61.

#### **Automatic zero-point correction**

Zero point is corrected automatically for minor deviations if the change is within the range of limited zeroing range value. Disable this correction at the applications like tank weighing, batching, filling etc. against wrong zeroing at feeding. Refer to Automatic Zero Tracking **parameter 515**, page 61.

Automatic zero-point correction range is limited together with zeroing range above.

#### Automatic zeroing at power on

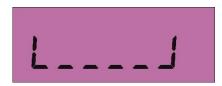
Zero point is corrected automatically at power on the instrument to compensate zero drifts of the scale if the scale is always power on when unloaded. This feature should be disabled for tank, silo, hopper scales etc. Power on zero has a limited range and the instrument announces [ POWER ON ZERO ERR ] error prompt in case of out of range.

Press key to start indication without zeroing and call service. If the range is 2%LK, the residual drift cannot be displayed. Refer to Power on Zero parameter 513., page 60.

#### **Basic weighing**

- 1. Zeroing the unloaded scale.
- 2. Place weighing item on the scale.
- 3. Wait until the motion monitor disappears.
- 4. Read the weighing result.

If the loading is out of the indication range the prompts below are displayed.







Over than positive indication limit

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#### Net weighing in the container

Taring is used to weight material in the container.

- 1. Place the empty container on to the scale and press key.
- 2. The zero display and the NET symbol appear.
- 3. Check >0< sign on the display. If it does not appear, press the key once more for correct taring.
- 4. Add the material into the container and follow its weight in net.

#### Clearing the tare

Press key to clear the tare. The NET symbol disappears, and Gross symbol appears on the display together with the gross weight indication. The scale instability will not impact clear the tare.

#### **Automatic taring**

The scale tares automatically and NET is displayed, after placing a weight on the empty scale, if this feature is enabled. Refer to **parameter 232** at page 56. The weight should be heavier than the value entered to the **parameter 518** for automatic taring.

#### Automatic clear the tare

The tare is automatically cleared after emptying the scale if this feature is enabled. The scale instability will not impact clear the tare.

#### Restore status at power on

This function saves the tare status at power off and the instrument operates in Net at power on. This feature is used for tank and silo weighing applications.

#### **Printing**

To print a label, press key or key when the weight on the pan is stable. Printout format can be selected from parameter 161. Flintec PC software is used to program EPL printout data and download into the instrument for free programming the data output or for label printing including barcode. Refer to page 50, and 41 for details.

#### 5.2 ADVANCED FUNCTIONS

#### **High resolution**

If you press key, the weight value is displayed of 10 times higher resolution until pressing the same key again. High resolution is displayed temporarily for 5 seconds at approved scales. High resolution cannot be printed.

#### Unit change

It is possible to change the weight unit to metric unit from imperial unit or to imperial unit from metric unit. The unit change is available between kg and lb, and between g and oz.

#### Average weighing

APPLICATION: Living stock weighing, weighing of unstable load, unstable industrial weighing systems.

**RELATED PARAMETERS:** Sub-block 33-, page 57.

The dynamic weighing which needs averaging the measuring results some period can be programmed continuous weighing, e.g. livestock weighing. Continuous dynamic weighing can be used for loads which have very high vibration like reactors which has high speed mixers, conveyors etc.

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#### **Key lock**

FT-111 has a capability to lock the keys to avoid unauthorized person's interfering. The key(s) which would be locked are programmed in the setup at sub-block 34- .

#### Lock the keys:

- 1. Press key for more than 2 seconds. [PASSWORD: ] prompt appears on the display.
- 2. Press key.
- 3. Press key. a symbol appears on the display.

#### Unlock the keys:

- 1. Press key for more than 2 seconds. [PASSWORD: ] prompt appears on the display.
- 2. Press key.
- 3. Press key. symbol disappears.

#### **Passwords**

#### User password

This password is used to setup the interface, usage configuration and application related parameters for your application.

To enter the programming.

Display	Operation
[123.456 kg]	Press key until [ PASSWORD : ] prompts appears.
[PASSWORD]	+ + + keys sequentially for user entry.
[*** ]	Press key.
[1—INTERFACE ]	You entered to the programming main menu and the first main block $[1-INTERFACE]$ prompt appears.

#### Service password

This password is used by trained technical persons to access parameters of the instrument and calibration only. Refer to section 8.2 on page 43.

#### **Date and Time**

RELATED PARAMETERS: Parameters 251, 252 and 253.

#### Date format of the country

- 1. Enter the programming and go to parameter 251, page 56.
- 2. Press key to select date format: DMY ( DD.MM.YYYY ), MDY ( MM.DD.YYYYY) or YMD ( YYYY.MM.DD ) and press key to confirm.
- 3. Press key until [ SAVE : YES ] prompt appears.
- 4. Press key to save or press key to select "NO" to return operation without saving.

#### **Date adjustment**

- 1. Enter the programming and go to parameter 252, page 56.
- 2. Press key to enter the parameter.
- 3. Press key to increase or press key to decrease the blanking digit and press key to select digit.
- 4. Press key to confirm.
- 5. Press key until [ SAVE : YES ] prompt seen.
- 6. Press key to save or press key to select "NO" to return operation without saving.

#### Time adjustment

- 1. Enter the programming and go to parameter 253, page 56.
- 2. Press key to enter the parameter.
- 3. Press key to increase or press key to decrease the blanking digit and press key to select digit.
- 4. Press key to confirm.
- 5. Press key until [ SAVE : YES ] prompt seen.
- 6. Press key to save or press key to select "NO" to return operation without saving.

#### Tilt switch

Tilt switch is used to prevent wrong weighing in case of over tilting of platform. Connect tilt switch to the Input 4 of the instrument and enable tilt switch by setting the **parameter 51A**.

[ DUE TO TILTING ] [ ----- ] prompt is displayed in case of over tilting.

#### **User Language**

**RELATED PARAMETERS: Parameter 236.** 

You may set the operation and printout language of the instrument. The available languages are English, German, French, Italian, Spanish and Turkish.

#### Language selection

- 1. Enter the programming and go to parameter 236, page 56.
- 2. Press keys to select language and press key to confirm.
- 3. Press Esc key until [ SAVE : YES ] prompt seen.
- 4. Press key to save or press key to select "NO" to return operation without saving.

#### Bar graph to display the capacity usage

The Bar graph, which is located on the right side of the display, is used for the graphical visualization of the measured value. It changes according to the Gross weight even the scale is displaying in Net. The usage of the scale capacity and the available range are seen on the bar graph. In the example below 70% of the capacity is used and 30% is available.



# 5.3 BACKUP AND RESTORE (WITH SD CARD)

**RELATED PARAMETERS:** Sub-block **96** 

**IMPORTANT NOTE**: To back up FT-111, use an SD card with 16Gb maximum and formatted as FAT32. For FAT32 formatting, click the "Restore device defaults" and uncheck the "Quick format" box on the PC.

Set-up and calibration data of the FT-111 can be copied to an SD card to back up the instrument. After restoring this data to the instrument, you may go on operation without entering any data.

During the backup operation, setup (parameter groups 1,2 and 3) and calibration (parameter group 5) parameters are copied into the SD card.

There are three choices for restoring: Restoring all the data, only setup data, or only calibration data. Restoring the calibration data, the previous one gets lost. This feature is commonly used for loading set-up, calibration data to the new FT-111. The scale can be recalibrated after restoring the data if need be.

#### Back up

- 1. Insert a FAT32 formatted SD card with 16Gb max. and into the SD card slot (Refer to Section11.3).
- 2. Enter the programming mode, select the **parameter 961** and then press key (Refer to Section 8).

#### Restore

- 1. Insert the SD card having the backup of all the data into the SD card slot (Refer to Section11.3).
- 2. Enter the programming mode and go to parameter 962.
- 3. Select All or set-up or calibration and then press key (Refer to Section 8).

# 5.4 SETUP, BACKUP AND RESTORE VIA INDFACE2x SOFTWARE

Set-up and programming of FT-111 can be done via IndFace2X PC software.

- 1. Download free IndFace2X software from Flintec web page and install it into your PC,
- 2. Connect FT-111 to the PC via USB port, RS232C port or Ethernet port.
- 3. Set port parameters of software to indicator parameters after energizing the instrument.
- 4. Click connect button.
- 5. Please refer to Indface2x software document for further information.

## 5.5 FIRMWARE UPGRADE

For the firmware upgrade you need a PC with Windows 10 operating system and a micro-USB cable. Please refer to FT-11x Weighing Terminal Firmware Update document to load the new firmware.

# 5.6 COPYING THE WEIGHING-RELATED DATA FROM SD CARD TO A PC

FT-111 has data logging feature that can record all weighing-related data to the SD card. This data can be transferred to a PC, as explained below.

- 1. Prepare a PC with a terminal program such as Hyperterminal.
- 2. PC to FT-111 connection can be done in two ways.
  - a. Direct connection via RS232/485/Ethernet/USB
  - b. Via local area network. If PC and FT-111 are connected to the same local area this connection can be made. After Ethernet connection enter the IP number of FT-111 to the terminal program.
- 3. Select the data format of the port connected to FT-111 as BSI and make other necessary communication settings for the port accordingly (Refer to page 45).
- 4. Send BSI command "L" via terminal program to transfer data from SD card to PC. (Refer to Section 11.4)
- 5. After sending "L" command, the data in the SD card is copied to the PC. Save data to PC when copying is finished.
- 6. After saving the data, send the "E" BSI command to delete the data in the SD card.

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# **6 DIGITAL INPUTS AND OUTPUTS**

**APPLICATION:** Digital inputs are used to control the instrument and the digital outputs can be used to control gates, valves etc. or to produce alarm.

RELATED PARAMETERS: Sub-blocks 35- and 36-.

The weighing indicator has 4 digital inputs and 5 digital outputs if equipped with any option board. You may enter set point values of the item after pressing key or you may recall them from Memory. Set Memory has 500 pcs item record capacity, and each item has 5 set point values.

Refer to section 11, page 75 for technical details on Digital Inputs / Outputs including their connection.

Digital inputs and outputs are set to their functions in sub-blocks 35- and 36-. Digital inputs can be programmed for zeroing, taring, print etc. in sub-block 35-. Digital outputs can be programmed for the different functions as described below.

The digital inputs and outputs are programmable to use them as a Remote IO of PLC via fieldbus additional to their usage at weighing related functions. Remote IO's of PLC can be used for level control of material tank, conveyor control, solenoid control, alarm etc.

The input and outputs are configurable as indicated in the table below.

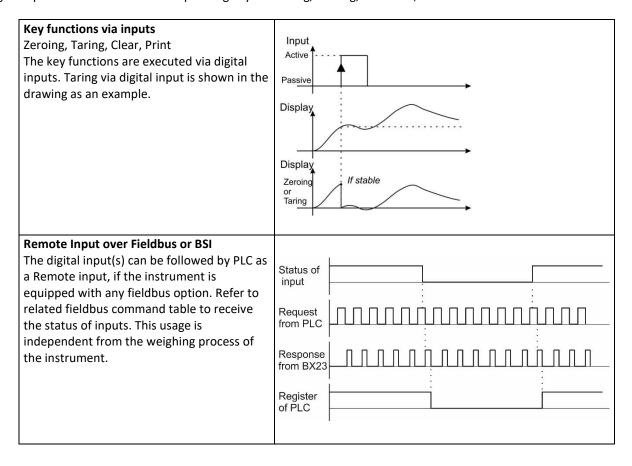
In / Out	Descriptions	Related parameter
Input 1	Zeroing, Taring, Clear, Print, Key lock, Remote Input of the PLC via Fieldbus.	351
Input 2	Zeroing, Taring, Clear, Print, Key lock, Remote Input of the PLC via Fieldbus.	352
Input 3	Zeroing, Taring, Clear, Print, Key lock, Remote Input of the PLC via Fieldbus.	353
Input 4	Zeroing, Taring, Clear, Print, Key lock, Remote Input of the PLC via Fieldbus.	354
Output 1	Set point1, Zero Range, Stable, Error, Remote output of the PLC via fieldbus.	361
Output 2	Set point2, Zero Range, Stable, Error, Remote output of the PLC via fieldbus.	362
Output 3	Set point3, Zero Range, Stable, Error, Remote output of the PLC via fieldbus.	363
Output 4	Set point4, Zero Range, Stable, Error, Remote output of the PLC via fieldbus.	364
Output 5	Set point5, Zero Range, Stable, Error, Remote output of the PLC via fieldbus.	365

Digital inputs and outputs are set to their functions in sub-blocks 35- and 36-. Digital inputs can be programmed for zeroing, taring, print etc. in sub-block 35-. Digital outputs can be programmed for the different functions as described below.

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## **6.1** DIGITAL INPUTS

Digital inputs can be used instead of pressing keys for taring, zeroing, clear tare, transfer data etc.

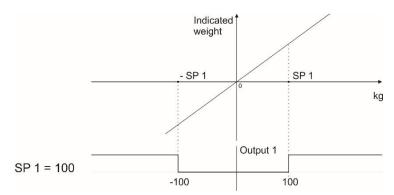


# **6.2** DIGITAL OUTPUTS

Digital outputs can be programmable as free set points which can be programmed for different functions as seen below.

#### S AIN Free set point of absolute indicated weight

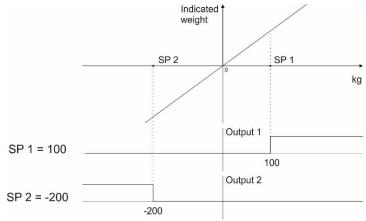
The digital output is activated with comparing the set point value and absolute indicated weight value as shown in the figure below.



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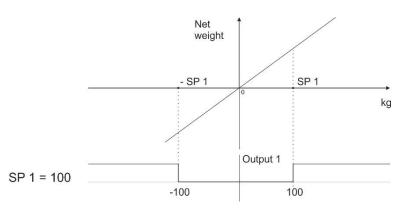
#### S IND Free set point of indicated weight

The digital output is activated with comparing the set point value and indicated weight value as shown in the figure below.



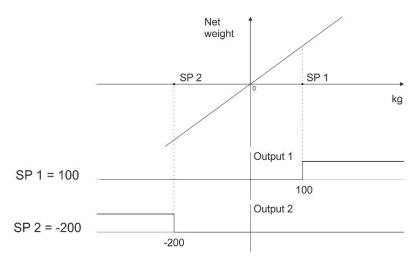
### S ANE Free set point of absolute net weight

The digital output is activated with comparing the set point value and absolute net weight value as seen below.



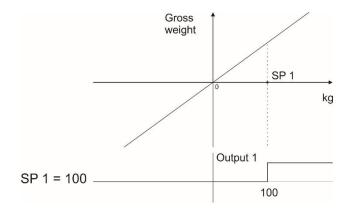
#### S NET Free set point of net weight

The digital output is activated with comparing the set point value and net weight value as seen below.



#### S GRO Free set point of gross weight

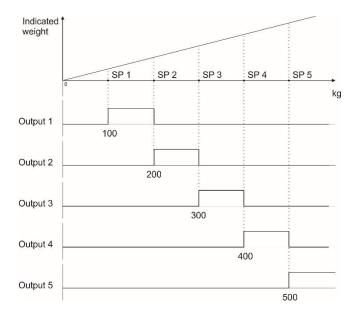
The digital output is activated with comparing the set point and weight at gross weight indication as seen below.



#### SPC1 Control mode-1

The digital outputs are activated as seen below, if set points are set up to Control mode-1 and their values are entered consequently from set point 1 to the set point N how much needed.

Digital outputs which are not used at this mode can be programmed freely to any other function. For example, if SP5 is not needed to control, it can be programmed to the zero range to produce empty signal.

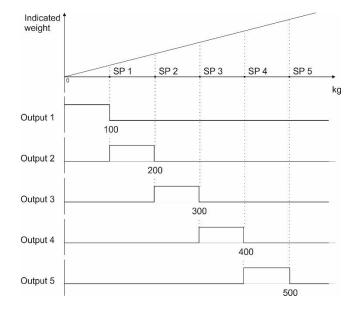


#### SPC2 Control mode-2

The digital outputs are activated as seen below, if set points are set up to Control mode-2 and their values are entered consequently from set point 1 to the set point N how much needed.

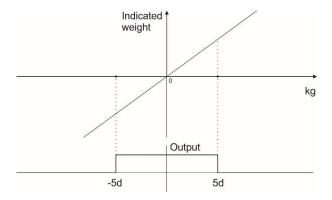
Digital outputs which are not used at this mode can be programmed freely to any other function. For example, if SP5 is not needed to control, it can be programmed to the zero range to produce empty signal.

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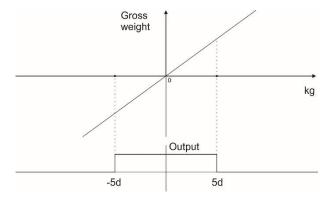
#### ZR I Zero range of the indicated weight

The digital output is activated if the absolute indicated weight value is in the zero range. Refer to parameter 366 to enter zero range value.



#### ZR G Zero range of the gross weight

The digital output is activated if the gross weight value is in the zero range. Refer to parameter 366 to enter zero range value.



# Stable

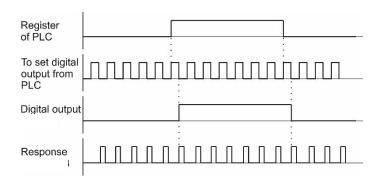
The digital output is activated at the displayed weight value is stable.

#### Error

The digital output is activated when any Error is announced on the display.

#### Remote Output of the PLC via fieldbus or BSI

The digital output(s) can be controlled from PLC as a Remote output if the instrument is equipped with any fieldbus option. Refer to related fieldbus command table to activate or deactivate the outputs. This usage is independent from the weighing process of the instrument.



### Entry the set point values

- 1. Press the key.
- 2. The set point 1 value appears on the display as value is seen on the display [SP 1 1250 kg].
- 3. Press key to increase or press key to decrease the blanking digit and press key to select digit.

  You may press key to enter negative set point value. Press the key to save it and to go to the next set point.
- 4. Repeat from step 2 for entering following set points.
- 5. The FT-111 returns to the operation after displaying set point 5 and entering its value,
- 6. Press key to return operation at any step.

## Set point entry into SET memory

- 1. Press key for more than 2 seconds. [ MEMORY ] prompt appears.
- 2. Press key. The last used set memory group number appears as [SET: 111].
- 3. Enter the new memory code by pressing key to increase or key to decrease the blanking digit and press key to select digit.
- 4. Press key to enter into the item.
- 5. The first set point value is seen on the display as [SET 111 SP1 ] [ 10.00 kg ]. Enter the new value by pressing key to increase or key to decrease the blanking digit and press key to select digit.

  Press key to confirm.
- 6. The following limit value appears as [SET 111 SP2] [ 20.00 kg]. Enter new value by keys and press the key.
- 7. Repeat step 4 and 5 until entering values to other three set point value of the group.
- 8. After entering the value of 5th set point value press key to go next memory code.
- 9. Or press key to exit.

### Select limits of item from SET memory

- 1. Press key. The last used set point value appears on the display as [SP1 1250 kg].
- 2. Press key. The last used set memory code appears on the display [SET: 111].
- 3. Enter the memory code of the item by pressing key to increase or key to decrease the blanking digit and press key to select digit.
- 4. Press key to confirm.
- 5. The selected Set memory data is loaded after displaying values.
- 6. Or press key to exit without loaded.

# 7 RS232 AND RS485 DATA OUTPUTS

FT-111 Weighing Terminal has 2 x RS 232, RS 485, USB, and Ethernet standard interfaces. In this section, you will find the data structure of different type of the data outputs via these serial ports. If you transmit ASCII codes of **P**(print), **Z**(zero), **T**(tare) or **C**(clear) letters to the serial port of FT-111; it will act like the related key is pressed.

## 7.1 CONTINUOUS DATA OUTPUT

Continuous data output of the instrument is transmitted in the following data structure. The serial ports of FT-111 are suitable for bi-directional communication.

CR (Carriage return) and LF (Line feed) codes can be enabled or disabled from response.

CHK (Checksum) can be enabled or disabled from both command and response and only continuous data output can be programmed for more than one interface.

The data format of continuous data output is:

	Status			Indic	ated					Tare									
STX	STA	STB	STC	D5	D4	D3	D2	D1	D0	D5	D4	D3	D2	D1	D0	CR	LF	СНК	

The including of the status bytes STA, STB and STC are:

Defin	Definition Table for Status A (STA)											
Bits (	0, 1 and 2	2		Bits	3 and 4		Bit 5	Bit 6	Bit 7			
0	1	2	Decimal point	3	4	Increment size						
0	0	0	XXXXOO	1	0	X 1						
1	0	0	XXXXXO	0	1	X 2						
0	1	0	XXXXXX	1	1	X 5	s 1	s 1				
1	1	0	XXXXX.X				Always	Always	Х			
0	0	1	XXXX.XX				A A	≥				
1	0	1	XXX.XXX									
0	1	1	XX.XXXX									
1	1	1	X.XXXXX									

Definition Table for Status B (STB)							
Bit 0	0 = Gross	1 = Net					
Bit 1	0 = Weight positive	1 = Weight negative					
Bit 2	0 = No Error	1 = Error					
Bit 3	0 = Stable	1 = Unstable					
Bit 4	Always = 1						
Bit 5	Always = 1						
Bit 6	0 = Not power on zeroed	1 = Zeroed with power on zero					
Bit 7	X						

Definition Table for Status C (STC)						
Bit 0	Always 0					
Bit 1	Always 0					
Bit 2	Always 0					
Bit 3	Always 0					
Bit 4	Always 1					
Bit 5	Always 1					
Bit 6	Always 0					
Bit 7	X					

#### Calculation of the checksum

CHK (Checksum) = 0 - (STX + STATUS A + ..... + LF)

Error Messages: UNDER, OVER, A.OUT, L-VOLT and TILT are represented in Indicated data fields.

Note: The weight data is represented with right aligned and the error messages are represented with left aligned.

# 7.2 FAST CONTINUOUS DATA OUTPUT

Fast continuous "indicated weight" data output can be used only for the instruments which can communicate fast. The output rate is related with the baud rate. Use higher baud rate for faster data rate. CR and LF can be enabled. You may reduce the data transfer speed by increasing the delay between data output packages.

The data format of the fast continuous data output is; [STX][STATUS][SIGN][WEIGHT VALUE][CR][LF]

Examples:

S+000123.4 (weight is stable and 123.4)
D+000123.4 (weight is unstable and 123.4)

 $egin{array}{lll} egin{array}{lll} egin{arra$ 

# 7.3 PRINT MODE

The format of the data output in Print mode can be selected in 5 different type forms in the sub-block 16-. Only one serial port can be programmed for printing. Print mode data outputs is sent by pressing the key or by receiving ASCII P command via serial port, or via Ethernet port by setting remote IP and remote port number, refer to parameter 19E and 19F.

#### SINGLE LINE

You can transmit the printout data in single line format by pressing key. This format is recommended to send the print data to PC or to any host. The data output structure is;

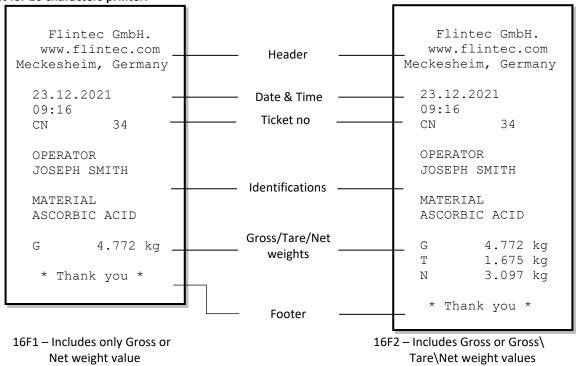
CN: 71 G: 3.007kg T: 1.001kg N: 2.006kg \*ALB: 5\*

DAT E		TIM E		CN		GROS S		TARE		NET		ALB	C R	L F
10	3	5	3	9	3	13	3	13	3	13	4	12	1	1

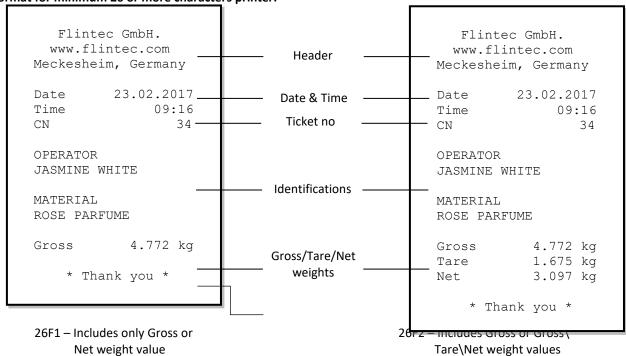
#### **MULTI LINE**

You can send the data in multiple line formats as seen in the label given below by pressing key. The data output including can be programmed with printer parameters. The multiline data output can be programmed for 16-byte narrow printers and for others.

Format for 16 characters printer:



Format for minimum 26 or more characters printer:



### 7.4 EPL FORMAT

The EPL format of the data output in Print mode is selected to print the label data in graphical format EPL. You can design your label in EPL format by using the printer label design software and Flintec software as describe below.

- 1. Connect FT-111 weighing terminal to Flintec Indface2x software.
- 2. Enter EPL print format window. You will find the command table which includes commands to get data from weighing in the label design.
- 3. Open label design software of the printer. Design your label by using the commands in item 2.
- 4. Save/Compile/ Convert your design to EPL format in Label design software.
- 5. Import the EPL file into Indface2x window.
- 6. Load this file into weighing terminal



Figure 7.1- Sample of the label printout of FT-111 which is designed in EPL format.

If the label design can be saved into the printer, the default of EPL format of FT-111 can be transferred to the printer to print a designed label. The default of EPL format is as:

Net weight	748
Gross weight	748
Tare weight	0
Date	25.05.2018
Time	08:39
Consegutive number	4
Alibi number	0
Unit	kg

### 7.5 BSI DATA STRUCTURE FOR DIALOG WITH PC

Flintec instruments can be integrated into a computer system, data acquisition system, data logging system, etc. FLINTEC weighing terminals launched on the market support the standardized BSI data format command set, depending on the device functionality. This simple data format offers the advantages of a reliable and fast interface with communicating PLC or PC for process control or transaction applications. FT-111 has a BSI-Base command set for connecting peripheral devices.

Refer to BSI Protocol to Interface with PC and PLC for details, page 80.

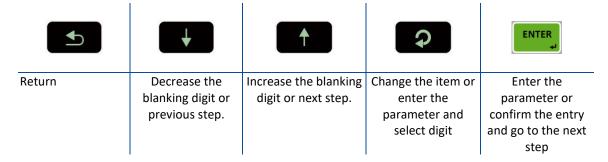
### 7.6 FIELDBUS INTERFACE

The FT-111 weighing terminal has optional fieldbus interfaces like Profibus, Profinet, CANopen etc. to use the instrument in process control.

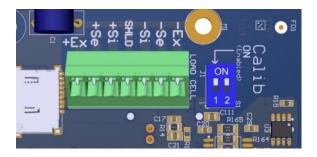
Refer to section 11, Optional Boards for details.

# **8 Programming and Calibration**

You will find the programming and calibration procedure of FT-111 weighing terminal in this section. The arrows on the lower right corner of the keys under the display indicate the function of the keys in programming menu. The basic meanings of these keys are;



A set-up DIP switch is located as shown in the figure below and its position should be "ON" to change the metrological related parameters including calibration.



DIP Switch	Description
1	Calibration SW
	OFF : Locked
	ON:Set-up
2	Reserve

Figure 8.1- Location of the calibration DIP switch

# 8.1 Alphanumeric Entry for Headers and Footers

Press the following keys to enter alphanumeric data to the header and footer of the weighing ticket in programming menu. Then press the key to go to the next step.

+	<b>1</b>	CLEAR *	Ç
	Increase from A to Z character the blanking digit.	Deletes last entered digit	Shifts right the cursor

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# 8.2 Entering to the Programming and Calibration

To enter the programming menu, you should follow the description in the table below. Legally related parameters can be changed if the calibration dip switch is at ON position. These parameters are marked with **M**-symbol in the parameter table in this section. If you will change any legally relate parameter or will perform calibration, set the calibration switch to the ON position before entering to the programming.

Display	Operation
[123.456 kg]	Press key until [ PASSWORD : ] prompts seen.
[PASSWORD]	+ + + + + + + + + + + + + + + + + + +
[**** ]	Press key.
[1—INTERFACE ]	You entered to the programming main menu and the first main block $[1-INTERFACE]$ prompt appears.

# 8.3 QUICK ACCESS PARAMETER BLOCKS USED FREQUENTLY

The instrument has fast access feature to the frequently adjusted parameters for easy set-up or service. As described in the previous section, if you press the keys below more than 2 seconds at main block **[1—INTERFACE]**, you will access to the parameter blocks fast.

Fast access key	Function
Esc 🗻	Press this key to access the fieldbus parameters, Sub-block [ 19- ].
-÷	Press this key to access the calibration, Sub-block [ 621].
CLEAR *	Press this key to access the diagnostic parameters, Main-block [9].

### **8.4** EXIT FROM PROGRAMMING

- 1. Press key until [SAVE: YES] prompt appears on the display.
- 2. Press key to save the changes into the memory or
- 3. Press key to change item to [SAVE: NO] prompt appears, press key to leave the programming without saving the changes or
- 4. Press key to change item to [ SAVE : BACK ] prompt appears, press key to return to menu or
- 5. Press key to change item to [SAVE : TEMP] prompt appears, press key to store the changes until the power off the instrument.

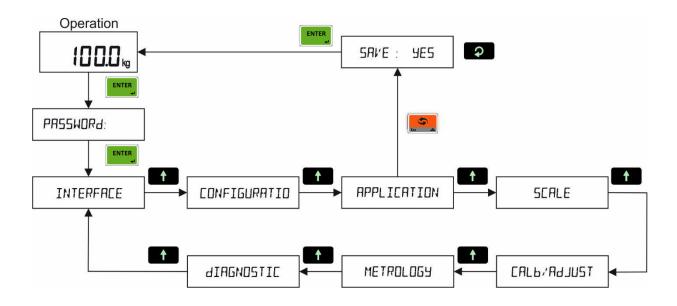
[ WAIT ] message appears on the display for a little while, and the weighing terminal returns to the weighing mode.

**WARNING:** Do not forget to switch off the instrument and bring the calibration DIP switch position to the "OFF" before using your scale in trade.

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### 8.5 PROGRAMMING AND PARAMETERS

FT-111 weighing terminal is programmed under the seven main blocks in the programming menu which are serial interface, configuration, application, scale, calibration, metrology, and diagnostic.



Main blocks in the programming menu are displayed like [1-- INTERFACE ] and sub-blocks are displayed like [11-RS232C-1 ]. Parameters are located in the sub-blocks like [111 FORMAT: CONT].

You can move in the blocks by pressing or keys. After reaching the desired block, press key or key to enter it. After arriving the parameter to change, you may change its function by pressing key. If the value will be entered to the parameter press key to increase or press key to decrease the blanking digit and press key to select digit, then press or keys to go to the following parameter.

For example, to change the Baud rate of RS485 serial interface to 57600;

- 1. After entering the programming, the [1-- INTERFACE ] sub-block prompt appears. Press key.
- 2. [11- RS232C.1] prompt appears. Press key until appearing [13- RS485] and press key.
- 3. [131 FORMAT: NO] prompt appears. Press key until appearing [132 BAUD: 9600] prompt.
- 4. Press key until [132 BAUD: 57K6] prompt appears.
- 5. Press key to go to the following parameter.

Legally related parameters can be changed if the calibration dip switch is at ON position. The values of these parameters limited according to the OIML against wrong set up. Legally related parameters are marked with **M**-symbol in the table below.

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[1 INTE	RFACE]	Interfa	ace E	Block
[ 1	INTERFAC	E	1	INTERFACE MAIN BLOCK  Press key sequentially to access this main block,  or press or key to enter configuration parameters,  or press key to go to the next block,  or press key to exit from programming.
[ 11-	RS232C.1		]	1st RS 232C SERIAL PORT  Press key or key again to enter this menu.  Or press key to go to the next sub-block.
[ 111	FORMAT	: PRNT	]	Data format of the serial port  NO : Port is disabled  CONT : Continuous data output  FAST : High speed continuous data output  PRNT : Printout  BSI : BSI format for PC, PLC interface  MBHL : Modbus RTU High-Low format  MBLH : Modbus RTU Low-High format
		FLINTEC	1	Press key to select output format different than Flintec'scontinuous data format while the selection is CONT in the information display.  Available functions are seen on the weight display after pressing key sequentially. Press key after selecting the data format.  Refe Refer to Continuous Data Formats, page 87 for details  FLINTEC: Flintec continuous format.  HBM: Commonly used by HBM, GSE, PT, Systec, Rinstrum.  TOLEDO: Commonly used by Toledo, Mettler Toledo.  SYSTEC: Commonly used by Systec.  SMA: Commonly used by USA producers, Cardinal, Rice Lake etc.  BASTER: Commonly used by Baster.  RINSTR: Commonly used by PT, Rinstrum, HBM, GSE.  AVERY: Commonly used by Avery E1205.  SARTOR: Commonly used by Sartorious.  LM2: Flintec LM2 (par.000=6)  LLINE2: Commonly used by Tunaylar.
[ 112	BAUD	: 9600	]	Baud rate  1200 : 1200
[ 113	LENGHT	: 8	]	Data Length 7 : 7 bits 8 : 8 bits
[ 114	PARITY	: NO	]	Parity  NO : No parity  ODD : Odd parity  EVEN : Even parity
[ 115	CSUM	: NO	]	Checksum at continuous and BSI formats.  NO : Checksum disable YES : Checksum enable

 $\label{lem:carriage} \textbf{Carriage return at continuous formats.}$ 

[ 116

CR

: YES

				NO : Carriage return disable YES : Carriage return enable
[ 117	LFEED	: YES	]	Line feed at continuous formats.
				NO : Line feed disable YES : Line feed enable
[ 118	DELAY	: 50	]	Data output delay at Modbus and BSI formats; delay between continuous format data.
				000 999 milliseconds.
[ 119	ADDRESS	: 00	]	Address of the port
				00 99. 00 means data format without address.
[ 12-	RS232C.2		]	2nd RS 232C SERIAL PORT Press key or key again to enter this menu. Or press key to go to the next sub-block.
[ 121	FORMAT	: NO	]	Data format of the serial port  NO: Port is disabled CONT: Continuous data output FAST: High speed continuous data output PRNT: Printout BSI: BSI format for PC, PLC interface MBHL: Modbus RTU High-Low format MBLH: Modbus RTU Low-High format  Press +0+ key to select output format different than Flintec continuous data format while the selection is CONT in the information display.  Available functions are seen on the weight display after pressing key sequentially. Press key after selecting the data format.  Refe Refer to Continuous Data Formats, page 87 for details
	[	FLINTEC	]	FLINTEC : Flintec continuous format.  HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum.  TOLEDO : Commonly used by Toledo, Mettler Toledo.  SYSTEC : Commonly used by Systec.  SMA : Commonly used by USA producers, Cardinal, Rice Lake etc.  BASTER : Commonly used by Baster.  RINSTR : Commonly used by PT, Rinstrum, HBM, GSE.  AVERY : Commonly used by Avery E1205.  SARTOR : Commonly used by Sartorious.  LM2 : Flintec LM2 (par.000=6)  LLINE2 : Commonly used by Tunaylar.
[ 122	BAUD	: 9600	]	Baud rate  1200 : 1200

[ 123	LENGHT	: 8	]	Data Length
				7 : 7 bits
				8 : 8 bits
[ 124	PARITY	: NO	]	Parity
				NO : No parity
				ODD : Odd parity
				EVEN : Even parity
[ 125	CSUM	: NO	]	Checksum at continuous and BSI formats.
				NO : Checksum disable
				YES : Checksum enable
[ 126	CR	: YES	]	Carriage return at continuous formats.
				NO : Carriage return disable
				YES : Carriage return enable
[ 127	LFEED	: YES	1	Line feed at continuous formats.
			,	NO : Line feed disable
				YES : Line feed enable
				Data output delay at Modbus and BSI formats; delay between continuous
[ 128	DELAY	: 50	]	format data.
				000 999 milliseconds.
				333 IIIII3CC3IIG3.
[ 129	ADDRESS	: 00	]	Address of the port
				00 99.
				00 means data format without address.
				RS 485 SERIAL PORT
[ 13-	RS485		]	Press key or key again to enter this menu.
				Or press key to go to the next sub-block.
[ 131	FORMAT	: NO	]	Data format of the serial port Page
				NO : Port is disabled 38, 22
				CONT : Continuous data output
				FAST : High speed continuous data output
				PRNT : Printout  PSI : PSI format for PC DI C interface
				BSI : BSI format for PC, PLC interface  MBHL : Modbus RTU High-Low format
				MBLH : Modbus RTU Low-High format
				Press key to select output format different than Flintec continuous
				data format while the selection is CONT in the information display.
				Available functions are seen on the weight display after pressing
				key sequentially. Press key after
				selecting the data format. Refer to Continuous Data Formats, page 87 for
				details
	[	FLINTEC	]	FLINTEC : Flintec continuous format.
				HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum.  TOLEDO : Commonly used by Toledo, Mettler Toledo.
				SYSTEC : Commonly used by Systec.
				SMA : Commonly used by USA producers, Cardinal, Rice Lake etc.
				BASTER : Commonly used by Baster.
1				RINSTR : Commonly used by PT, Rinstrum, HBM, GSE.
				AVERY : Commonly used by Avery E1205.
				AVERY : Commonly used by Avery E1205.  SARTOR : Commonly used by Sartorious.  LM2 : Flintec LM2 (par.000=6)

				LLINE2 : Commonly used by Tunaylar
[ 132	BAUD	: 9600	]	Baud rate  1200 : 1200
[ 133	LENGHT	: 8	]	Data Length 7 : 7 bits 8 : 8 bits
[ 134	PARITY	: NO	]	Parity  NO : No parity  ODD : Odd parity  EVEN : Even parity
[ 135	CSUM	: NO	]	Checksum at continuous and BSI formats.  NO : Checksum disable  YES : Checksum enable
[ 136	CR	: YES	]	Carriage return at continuous formats.  NO : Carriage return disable  YES : Carriage return enable
[ 137	LFEED	: YES	]	Line feed at continuous formats.  NO : Line feed disable  YES : Line feed enable
[ 138	DELAY	: 50	]	Data output delay at Modbus and BSI formats; delay between continuous format data.  000 999 milliseconds.
[ 139	ADDRESS	: 01	]	Address of the port 00 99. 00 means data format without address.
[ 14-	USB		]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.
[ 141	FORMAT	: NO	]	Data format of the USB port  NO : Port is disabled  CONT : Continuous data output  FAST : High speed continuous data output  BSI : BSI format for PC, PLC interface
	[	FLINTEC	]	Press key to select output format different than Flintec continuous data format while the selection is CONT in the information display.  Available functions are seen on the weight display after pressing key sequentially. Press key after selecting the data format. Refer to Continuous Data Formats, page 87 for details.  FLINTEC: Flintec continuous format.  HBM: Commonly used by HBM, GSE, PT, Systec, Rinstrum.  TOLEDO: Commonly used by Toledo, Mettler Toledo.  SYSTEC:: Commonly used by Systec.  SMA: Commonly used by USA producers, Cardinal, Rice Lake etc.  BASTER: Commonly used by Baster.  RINSTR: Commonly used by PT, Rinstrum, HBM, GSE.  AVERY: Commonly used by Avery E1205.

					SARTOR : Commonly used by Sartorious.  LM2 : Flintec LM2 (par.000=6 )  LLINE2 : Commonly used by Tunaylar
[ 1	.42	CSUM	: NO	]	Checksum at continuous and BSI formats.  NO : Checksum disable  YES : Checksum enable
[ 1	L43	CR	: YES	]	Carriage return at continuous formats.  NO : Carriage return disable  YES : Carriage return enable
[ 1	44	LFEED	: YES	]	Line feed at continuous formats.  NO : Line feed disable YES : Line feed enable
[ 1	.45	DELAY	: 50	]	Data output delay at BSI formats; delay between continuous format data. 000 999 milliseconds.
[	15-	ETHERNET		]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.
[	151	FORMAT	: NO	]	Data format of the Ethernet port  NO: Port is disabled CONT: Continuous data output FAST: High speed continuous data output PRNT: Printout BSI: BSI format for PC, PLC interface MBHL: Modbus TCP High-Low format MBLH: Modbus TCP Low-High format  Press
			FLINTEC	]	FLINTEC : Flintec continuous format.  HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum.  TOLEDO : Commonly used by Toledo, Mettler Toledo.  SYSTEC : Commonly used by Systec.  SMA : Commonly used by USA producers, Cardinal, Rice Lake etc.  BASTER : Commonly used by Baster.  RINSTR : Commonly used by PT, Rinstrum, HBM, GSE.  AVERY : Commonly used by Avery E1205.  SARTOR : Commonly used by Sartorious.  LM2 : Flintec LM2 (par.000=6)  LLINE2 : Commonly used by Tunaylar.
[	152	IP	: 250	]	IP address. Default is 192.168.016.250
[	153	ADDRESS	: 01	]	Address of the port 00 255. 00 means data format without address.
[	154	SUB MASK	: 000	]	Subnet mask address.  Default is 255.255.255.000
[	155	GATEWAY	: 253	]	Gateway address.

					Default is 192.168.016.253
[	156	LOCAL P1	: 502	]	Local port 1. 000 65535
[	157	LOCAL P2	: 503	]	Local port 2. 000 65535
]	158	LOCAL P3	: 504	]	Local port 3. 000 65535
]	159	DNS	: 222	]	DNS address.  Default is 208.067.222.222
[	15A	MAC ADR	:	]	MAC address. AA:BB:CC:DD:EE:FF
[	15B	TIMEOUT	: 5	]	Inactivity time out.  00 means disable.  01 60 sec.
[	15C	CR-LF	: YES	]	Carriage return and Line feed at continuous formats.  NO : Disable YES : Enable
[	15D	DELAY	: 050	]	Data output delay at demand formats; delay between continuous format data.  000 999 milliseconds.
[	15E	REMOTEIP	: 000	]	Remote IP address. (Client mod)  If FT-111 Ex2 is to be connected to a remote device automatically either at startup or when exiting the programming menu IP address of the device must be entered.  Default is 0.0.0.0
[	15F	REMOTEPO	: 0	]	Remote port. Enter the port number of the remote device. 0 65535
[	16-	PRINTER		]	PRINTER  Press key or key again to enter this menu.  Or press key to go to the next sub-block.
[	161	FORMAT	: 26F2	]	Data format of the printout  SING : Single line  16F1 : Multiline Format 1 for 16 Character printer  16F2 : Multiline Format 2 for 16 Character printer  26F1 : Multiline Format 1 for 26 Character printer  26F2 : Multiline Format 2 for 26 Character printer  EPL : EPL Format

KEY : Printing with key LOCK : Print interlock. Only one time printout, if weigh change is more than 10 division.  AUTO : Auto print, if the gross load is bigger than MIN WEIGHT and stable. Unload and load the scale is next printing.  LOAD : Autoprint if W>MIN WEIGHT and weight change more than 10d.  [ 163 PRT MSG : NO ] Display " PRINTING " message at printout NO : Disable	for
WEIGHT and stable. Unload and load the scale is next printing.  LOAD: Autoprint if W>MIN WEIGHT and weight change more than 10d.  [ 163 PRT MSG: NO ] Display "PRINTING" message at printout NO: Disable	for
LOAD : Autoprint if W>MIN WEIGHT and weight change more than 10d.  [ 163 PRT MSG : NO ] Display " PRINTING " message at printout NO : Disable	e is
NO : Disable	
YES : Enable	
[ 164 CN : YES ] Ticket number on printout.	
NO : Disable YES : Enable	
[ 165 DATE : NO ] Date printing on printout.  NO : Disable	
YES : Enable	
[ 166 TIME : NO ] Time printing on printout.	
NO : Disable	
YES : Enable	
LABEL SETUP	
[ 17- LABEL SETUP ] Press key or key again to enter this menu.	
Or press key to go to the next sub-block.	
[ 171 HEADER1 : ] Header of printout, the first line.	Page 40
Maximum 20 characters.	
[ 172 HEADER2 : ] Header of printout, the second line.	Page 40
Maximum 20 characters.	
[ 173 HEADER3 : ] Header of printout, the third line.	Page 40
Maximum 20 characters.	
[ 174 FOOTER1 : ] Footer of printout, the first line.	Page 40
Maximum 20 characters.	
[ 175 FOOTER2 : ] Footer of printout, the second line.	Page 40
Maximum 20 characters.	
[ 176 LF BEFO : +2 ] Line feed before printout (Press key to change )	
: += Forward, -= Backward	
: NO,1,29 : Line feed quantity before data.	
<u>Example</u> : +2 means 2-line feed forward.	
[ 177 LF AFTE : +4 ] Line feed after printout (Press key to change )	
: += Forward, -= Backward	
: NO,1,29 : Line feed quantity after data.	
Example: -2 means 2 line feed backward.	

[ 178	FORM FE	: NO	]	Form feed.
				NO : Disable YES : Enable
[ 179	LEFT SP	: 3	]	Space from left of the label. 09
[ 17A	СОРҮ	: 1	]	Copy quantity.
				ANALOGUE OUTPUT (Appears if the option is installed )
[ 19-	ANALOGUE	OUT	]	Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to the next main block.
[ 191	ТҮРЕ	: 4-20	]	Analogue output type  4-20 : 4 mA - 20 mA  0-20 : 0 mA - 20 mA  0-10 : 0 VDC- 10 VDC  0-5 : 0 VDC- 5 VDC
[ 192	MINIMUM	: 00.0	]	The minimum of the analogue output. Default 00.0 means the minimum output is not drifted. e.g. enter 1.0 to set output to 1.0 volt at 0 kg in 0 -10 V range.
[ 193	MAXIMUM	: 00.0	]	The maximum of the analogue output. 00.0 means the maximum output is not drifted. e.g. enter 9.0 to set output to 9.0 volt at Max load in 0 -10 V range.
[ 194	SOURCE	: GROS	]	Source of the analogue output  GROS : Gross weight INDI : Indicated weight
[ 195	ZERO ADJ	:	]	Displays the count value of unloaded scale.  Increase or decrease by pressing or ; or enter the value by pressing numerical keys to change the analogue output at zero indication.  and keys can be used for faster change.
[ 196	SPAN ADJ	:	]	Displays the count value of the full loaded scale.  Increase or decrease by pressing or ; or enter the value by pressing numerical keys to change gain of the analogue output.  and keys can be used for faster change.
[ 197	AUTO ADJ	: NO	]	Set analogue output to a new type or set to the original range.  NO : No YES : Automatic adjustment the original range if changed.  Note: Set Minimum and maximum limits after automatic adjustment.
[ 19-	PROFIBUS		]	PROFIBUS CONFIGURATION (Appears if the option is installed)  Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to the next main-block.
[ 191	FORMAT	: INTG	]	Page 100 Data format of the Profibus

					INTG : Signed 32 bit integer, no decimal point implied.  FLOA : 32 bit float, decimal point implied.
[	192	ADDRESS	: 001	]	Node address 001125
[	19-	PROFINET		]	PROFINET CONFIGURATION (Appears if the option is installed)  Press key or key again to enter this menu.  Press key to go to thebeginning of the sub-block or press key to go to the next main block.
[	191	FORMAT	: INTG	]	Data format of the Profinet  INTG : Signed 32 bit integer, no decimal point implied.  FLOA : 32 bit float, decimal point implied.
[	192	IP	: 250	]	IP address of Ethernet port. Default is 192.168.16.250
[	194	SUB MASK	: 000	]	Subnet mask address of Ethernet port.  Default is 255.255.255.000
[	195	GATEWAY	: 253	]	Gateway address. Default is 192.168.16.253
[	196	S. NAME	: SCAL	]	Station (device) name.  Default is SCALE-1. Station name can be up to 16 characters. Use only Latin alphabet characters.
[	19A	MAC ADR	:	]	MAC address AA:BB:CC:DD:EE:FF
[	19-	ETHERNET IP		]	Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to the next main block.
[	191	FORMAT	: INTG	]	Data format of the EtherNet/IP Page 106  INTG: Signed 32 bit integer, no decimal point implied.  FLOA: 32 bit float, decimal point implied.
[	192	IP	: 250	]	IP address of Ethernet port. Default is 192.168.16.250
[	194	SUB MASK	: 000	]	Subnet mask address of Ethernet port.  Default is 255.255.255.000
[	195	GATEWAY	: 253	]	Gateway address.  Default is 192.168.16.253
[	19A	MAC ADR	:	]	MAC address AA:BB:CC:DD:EE:FF

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[	19-	ETHERCAT		j	Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to the next main block.
[	191	FORMAT	: INTG	]	Data format of the EtherCAT Page 110  INTG: Signed 32 bit integer, no decimal point implied.  FLOA: 32 bit float, decimal point implied.
[	19-	CC-LINK		]	CC-LINK CONFIGURATION (Appears if the option is installed)  Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to the next main block.
[	191	FORMAT	: INTG	]	Data format of the CC-Link  INTG: Signed 32 bit integer, no decimal point implied.  FLOA: 32 bit float, decimal point implied.
[	192	ADDRESS	: 001	]	Node address 00164
[	193	BAUD	: 156K	]	Baud rate  156K : 156 kbps 625K : 625 kbps 2.5M : 2.5 Mbps 5M : 5 Mbps 10M : 10 Mbps
[	19-	POWERLINK		]	POWERLINK CONFIGURATION (Appears if the option is installed)  Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to the next main-block.
[	191	FORMAT	: INTG	]	Data format of the Powerlink  INTG : Signed 32 bit integer, no decimal point implied.  FLOA : 32 bit float, decimal point implied.
[	192	ADDRESS	: 001	]	Node address 001239

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# [2-- CONFIGURATIO] Configuration Block

<u> 2</u>	CONFIGURATIO] Configuration Block							
[	2	CONFIGURAT	ΓΙΟ	]	Press key sequentially to access this main block, or press or key to enter configuration parameters, or press key to go to the next block, or press key to exit from programming.			
[	21-	DSPLY ACUST	гі	1	DISPLAY AND ACOUSTIC  Press key or key again to enter this menu.  Or press key to go to the next sub-block.			
[	211	LIGHT	: ON	]	Backlight  OFF : Backlight disabled.  ON : Always bright.  AUTO : Automatic backlight to increase the battery life.			
[	212	COLOR	: TURQ	]	Backlight color  WHIT: White  LGRE: Light Green  GREE: Green  TURQ: Turquoise  BLUE: Blue  YELL: Yellow  AMBE: Amber  RED: Red			
[	213	KEYSOUN	: YES	]	Key sound NO : Disable YES : Enable			
[	214	REFRESH	: 5	]	Display refresh rate X: 19 times/sec			
[	22-	INFO DISPLA	Y	]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.			
[	221	TIME	: D+T	]	Information data on the right of the alphanumeric display.  NO : No clock data on the display.  T : Display time,  D : Display date,  D+T : Display date and time,			
[	222	DATA	: TARE	]	Information data on the left of the alphanumeric display.  NO : No data  TARE : Tare weight is displayed  GROS : Gross weight is displayed in Net  Note: The par 221 is set to NO, if this parameter is not programmed NO, TARE or GROS.			
[	23-	START UP		]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.			
]	231	TARING	: MULT	]	Taring.  NO: Disabled.  MULT: Tare with key, via serial interface or via digital input.  GROS: Tare with key, via serial interface or via digital input only at gross.			

[	232	AUTO T	: NO	]	Auto taring. Page 28  NO : Disabled.  YES : Auto tare if the gross load is bigger than MIN TARE and stable.
[	233	AUTO CLR	: NO	]	Auto clear. Page 28  NO : Disabled. YES : Auto clear, if the gross load is lower than 10d.
[	234	PWR TARE	: NO	]	Restore Tare at power on  NO : Disabled.  YES : Tare value is saved at power off and the indication is start in  NET after switch on the instrument.
[	235	FILTER	: HIGH	]	Adaptive digital filter.  NO: Disable. Fastest weighing; but the most sensitive to environmental vibrations.  VLOW: Very low filtering  LOW: Low filter  MEDI: Medium filter  HIGH: High filter  VHIG: Very high filter. Slowest and the most stable weighing.
[	236	LANGUAGE	: ENG	1	User language.  ENG : English  DEU : Deutsch  FRA : Français  ITA : İtaliano  ESP : Espagnol  TUR : Türkçe
[	25-	ENTRIES		]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.
[	251	DATE	: DMY	]	Date format  DMY: DD.MM.YYYY  MDY: MM.DD.YYYY  YMD: YYYY.MM.DD
[	252	DATE SET	:	]	Date setting Page 29 XX.XX.XX
[	253	TIME SET	:	]	Time adjust Page 29 HH:MM
[	254	CN	:	]	Consecutive number Page 40 165535
[	255	S. NAME	: SCAL	]	Scale name.  Maximum 16 characters.  Default is SCALE-1

# [3-- APPLICATION] Application Block

<u>[</u> 3-	3 APPLICATION]		Application Block						
[	3	APPLICATION	]	APPLICATION RELATED PARAMETERS MAIN BLOCK  Press key sequentially to access this main block,  or press or key to enter configuration parameters,  or press key to go to the next block,  or press key to exit from programming.					
[	33-	AVERAGE FIL	г ]	WEIGHING OF UNSTABLE LOADS  Press key or key again to enter this menu.  Or press key to go to the next sub-block.					
[	331	OPERATE	: NO ]	Operation type Page 28  NO : Disable  YES : Continuous dynamic weighing.					
[	332	FILTER	: 3.0 ]	Dynamic filtering time X.X seconds.					
[	34-	KEY LOCK	1	Or press key to go to the next sub-block.					
[	341	ON/OFF	: USE ]	ON/ OFF key locking USE : Not locked LOCK : Locked					
[	342	DATE	: USE ]	Date&Time key locking  USE : Not locked  LOCK : Locked					
[	343	G/N	: USE ]	Gross/Net key locking USE : Not locked LOCK : Locked					
[	344	SP	: USE ]	Set point key locking  USE : Not locked  LOCK : Locked					
[	345	PRINT	: USE ]	Print out key locking  USE : Not locked  LOCK : Locked					
[	346	UNIT	: USE ]	Unit change key locking  USE : Not locked  LOCK : Locked					
[	347	HIGHRE	: USE ]	High resolution key locking  USE : Not locked  LOCK : Locked					
[	348	TARE	: USE ]	Tare key locking  USE : Not locked  LOCK : Locked					
[	349	CLEAR	: USE ]	Clear key locking  USE : Not locked  LOCK : Locked					
[	34A	ZEROING	: USE ]	Zeroing key locking					

				USE : Not locked LOCK : Locked	
[	34B	ENTER : USE	]	Enter key locking  USE : Not locked  LOCK : Locked	
[	35-	DIG INPUTS	]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.	
[	351	INPUT 1 : NO	]	Digital input 1  NO : Not used  ZERO : Zeroing  TARE : Taring  CLR : Clear  PRNT : Print  LOCK : Key lock  FBUS : Controlled by fieldbus or BSI command.	Page 33
[	352	INPUT 2 : NO	]	Digital Input 2  NO : Not used ZERO : Zeroing TARE : Taring CLR : Clear PRNT : Print LOCK : Key lock FBUS : Controlled by fieldbus or BSI command.	Page 33
[	353	INPUT 3 : NO	]	Digital input 3  NO: Not used  ZERO: Zeroing  TARE: Taring  CLR: Clear  PRNT: Print  LOCK: Key lock  FBUS: Controlled by fieldbus or BSI command.	Page 33
[	354	INPUT 4 : NO	]	Digital input 4  NO : Not used ZERO : Zeroing TARE : Taring CLR : Clear PRNT : Print LOCK : Key lock FBUS : Controlled by fieldbus or BSI command.	Page 33

	_				DIGITAL OUTPUTS (Appears if the option is installed)	
[	36-	DIG OUTPU	TS	]	Press key or key again to enter this menu.  Press key to go to beginning of the sub-block or press key to go to the next main block.	<b></b>
[	361	OUT 1	: NO	]	Digital output 1  NO : Disable  SAIN : Absolute Indicated weight  SIND : Indicated weight  SANE : Absolute net weight  SNET : Net weight  SGRO : Gross weight  SPC1 : Control mode 1  SPC2 : Control mode 2  STAB : Weighing is stable  ZR I : Zero range of indicated weight  ZR G : Zero range of gross weight  ERRO : Error  FBUS : Controlled by Fieldbus or BSI command	Page 33
[	362	OUT 2	: NO	]	Digital output 2 For settings refer to Output 1	Page 33
[	363	OUT 3	: NO	]	Digital output 3 For settings refer to Output 1	Page 33
[	364	OUT 4	: NO	]	Digital output 4 For settings refer to Output 1	Page 33
[	365	OUT 5	: NO	]	Digital output 5 For settings refer to Output 1	Page 33
[	366	ZR [d]	: 1.0	]	Zero range in XX.X division. Default is 1.0 d.  For example: if the scale division is 0.5 kg and this parameter entry is 1.0 division.  The output is activated if the indication is lower than 0.5 kg.	Page 35
[	367	OUTPUTS	: IMME	]	Output changing.  IMME : Immediately change even scale is not stable.  STAB : Change if the scale is stable.	

## [5-- SCALE] Scale Block

The most important parameter is 511 which limits the use of the parameters in main blocks 5, 6 and 8. The selections of this parameter are

IND	Industrial weighing	Selections of parameters at set up and calibration are free for industrial
		usage of the instrument.
INDG	Industrial weighing	Autozeroing, taring and power on zero are disabled.
	only gross	(Recommended for tank /silo weighing in gross.)
INDN	Industrial weighing net	Autozeroing and power on zero are disabled.
	(Taring can be enabled)	(Recommended for tank /silo weighing in gross.)
OIML	Approved scale according to	Metrology related parameters are restricted to limits of OIML R76 and EU
	OIML	type approval of the instrument.

After setting **parameter 511**, even you set any parameter out of the accepted range of selection of **par 511**, it is saved in the acceptable limit. For example, if taring is activated at INDG selection, it will be disabled while exiting from set up. For approved scales, set the parameters in main blocks 5, 6 and 8 perform calibration carefully due to sealing of the scale in legal usage.

				SCALE RELATED PARAMETERS MAIN BLOCK			
[	5	SCALE	]	Press key sequentially to access this main block, or press or key to enter configuration parameters, or press key to go to the next block, or press key to exit from programming.			
[	51-	SET UP	]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.			
[	511	APROVAL : IND	]	M Approval  IND : Industrial. All parameters can be freely selected.  INDG : Industrial weighing of tank, hopper or silo in gross.  (Taring, AZTrack and Power on Zero are disabled)  INDN : Industrial weighing in Net of tank, hopper or silo  (disabled AZT and Power on Zero, enabled Tare)  OIML : OIML approved scale.			
[	512	HIGHRES : TOGG	]	M High resolution Page 28,  TEMP: Temporary indication with key TOGG: Toggle. Start and end high resolution by pressing key in sequence.  ALWA: Always high resolution			
[	513	PWR ZERO : NO	]	M Power on zero.  NO : Disable. 2% : ± 2% 2%LK : ± 2%, [ POWER ON ZERO ERR ] prompt cannot be erased. Call service.  10% : ± %10 15-5 : + %15, - %5 20% : ± %20			

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[	514	ZEROING	: 50% ]	M	Zeroing range with key  NO: Disable. 2%: ± 2% 3%: ± 3% 20%: ± 20% 50%: ± 50%
[	515	AZTRACK	: 0.5d ]	M	Automatic zero tracking.  Page 27  NO: Disable.  0.3d: ± 0,3d  0.5d: ± 0,5d  1d: ± 1d  2d: ± 2d  3d: ± 3d
[	516	STABLE	: 0.5d ]	M	Stability detection range  NO : Disable.  0.3d : ± 0,3d  0.5d : ± 0,5d  1d : ± 1d  2d : ± 2d  3d : ± 3d  4d : ± 4d
[	517	STBTIME	: 0.7 ]		Stability time  The scale is accepted as a stable to process if the scale is stable during this time. 0.1 9.9 seconds.
[	518	MIN TARE	: ]		Minimum tare for automatic taring  Taring can be done if loading is heavier than MIN TARE.
[	519	MINWEIGT	: ]		Minimum weight to produce printout.  The printout is produced if the loading is heavier than MINWEIGHT.
[	51A	TILT	: NO ]	М	Tilt switch to prevent wrong weighing results in mobile scales.  (Digital Input-4)  NO: Not used.  OPEN: Normally open contact.  CLOS: Normally closed contact.
	52-	BUILD	1	P	Press key or key again to enter this menu.  Press key to go to the next sub-block or press key to go to the next main block.
[	521	UNIT	: KG ]	М	The scale unit Page 28 Select NO, g, kg, t, oz or lb.
[	522	RANGE	: SING ]	М	Scale range  SING : Single Range  2MR : 2 x Multi Range  3MR : 3 x Multi Range  2MI : 2 x Multi Interval  3MI : 3 x Multi Interval

1						
]	523	MAX CAP1/d1 CAP2/d2 CAP3/d3	:	]   N	Enter so Capaciti	ale capacity and division after press key. es and divisions of MR and MI scales are entered
		C, 11 3, 43			as Cap1	, d1, Cap2, d2, Cap3, d3.
[	524	OVER	: 9d	] N	Limit of NO 1d 9d 2% 5%	Indication  : Over indication after Max  : 1 division more than Max  : 9 divisions more than Max  : 2% more than Max  : 5% more than Max
[	52A	BATTERY	: NO	] N	Battery	management.
					NO 12V BPAC	<ul><li>: Disables battery management.</li><li>: Enables battery management for 12V battery.</li><li>: Enables battery management for FT-Accu-Ex2 battery</li></ul>
[	52B	AUTO OFF	: 5	] N	Auto po NO 1 2 3 4 5 10	wer off time for battery management.  : Disabled Auto Power OFF.  : The scale is not used along 1 minute.  : The scale is not used along 2 minutes.  : The scale is not used along 3 minutes.  : The scale is not used along 4 minutes.  : The scale is not used along 5 minutes.  : The scale is not used along 10 minutes.
				T	GITAL LOA	AD CELL SETUP (Only FT-111D)
	53-	DLC SETUP		]	Press 2 Or press 2	key or key again to enter this menu.
[	532	QUANTITY	: 01	]		ty of digital load cell Page <b>71</b>
						ne quantity of DLC used in the scale. antity can be entered between 1 and 16.
[	533	ADDRESSING		]		sing of digital load cells
					Enter s	erial number after press key.
						NTRICITY ADJUSTMENT (Only FT-111D)
[	54-	SHIFT ADJUST		]		key or key again to enter this menu.
				1	ress T	key to go to the beginning of the sub-block or press key ext main-block.
[	541	METHOD :	: CELL			nent method Page 72
					CELL PAIR	<ul><li>: Individual load cell shift adjust</li><li>: Sectional pair shift adjustment</li></ul>
[	542	AUTO ADJUST		]		entricity Adjustment sentricity correction of scale is performed automatically.
] [	543	MANUAL ADJUS		]		Adjustment sentricity correction of scale is performed manually
1	544	SET TO 1	: NO	1		rarily set shift constants to 1
'		'			NO	: Normal operation
					YES	<ul><li>(entered shift constants are used).</li><li>: Test mode (shift constants are equal to 1).</li></ul>
						\ \

# [6-- CALB / ADJUST] Calibration and Adjustment Block

6 CALB / ADJUST   Calibration and Adjustment Block							
			SCALE ZERO AND SPAN SETTING MAIN BLOCK				
			Press key sequentially to access this main block,				
6	CALIB / ADJUST	]	or press or key to enter configuration parameters,				
			or press key to go to the next block,				
			or press key to exit from programming.  CALIBRATION				
64		,	Press key or key again to enter this menu.				
61-	CALIBRATION	J	Or press key to go to the next sub-block.				
611	TEST WEIGHT	1	M Scale calibration with test weight				
011	TEST WEIGHT	1	Scale calibration with test weight				
612	LINEARIZATIO	]	M Multipoint scale calibration to increase linearization				
613	ELECTRONIC	]	M eCal electronic calibration without test weight				
			ADJUSTMENTS				
62-	ADJUSTMENT	]	Press key or key again to enter this menu.				
			Or press key to go to the next sub-block.				
621	ZERO ADJUSTM	]	M Zero adjustment				
622	SPAN ADJUSTM	]	M Span adjustment				
623	S UNDER LOAD	]	M Span adjustment of loaded scale				
			Span adjustment under load				
			Span adjustment with temporary zeroing				
624	GRAVITY CAL	]	M Gravity acceleration of the place of the calibration.				
625	GRAVITY USAG	]	M Gravity acceleration of the place of the usage.				
			CALIBRATION COEFICIENTS				
63-	COFFEICIENTS	1	Press key or key again to enter this menu.				
03	COLITICIENTS	,	Press key to go to beginning of the sub-block or press key to go to the next main-block.				
			go to the next mani-block.				
631	LOAD COEFFIC	]	M The load weight used at the calibration is indicated here.				
632	ZERO COEFFIC	]	M This coefficient is determined the zero point of the scale.				
633	GAIN COEFFIC	]	M This coefficient is related with the gain factor of the scale.				
	61- 611 612 613 62- 621 622 623 624 625 631 631 632	6 CALIB / ADJUST  61- CALIBRATION  611 TEST WEIGHT  612 LINEARIZATIO  613 ELECTRONIC  62- ADJUSTMENT  621 ZERO ADJUSTM  622 SPAN ADJUSTM  623 S UNDER LOAD  624 GRAVITY CAL  625 GRAVITY USAG  63- COEFFICIENTS  631 LOAD COEFFIC  632 ZERO COEFFIC	6 CALIB / ADJUST ] 61- CALIBRATION ] 611 TEST WEIGHT ] 612 LINEARIZATIO ] 613 ELECTRONIC ] 62- ADJUSTMENT ] 621 ZERO ADJUSTM ] 622 SPAN ADJUSTM ] 623 S UNDER LOAD ] 624 GRAVITY CAL ] 625 GRAVITY USAG ] 63- COEFFICIENTS ] 631 LOAD COEFFIC ]				

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[8-- METROLOGY] Metrology Block

	8 METROLOGY Metrology Block						
[ 8 METROLOGY ] or press or press ke	N BLOCK equentially to access this main block, key to enter configuration parameters, y to go to the next block, y to exit from programming.						
	or key again to enter this menu.						
	Page 76 Disable Enable						
PRNT : R232 : USB :	libi data transfer port. to the printer port. to the RS232C. to the USB to the Ethernet TCP/IP.						
NUM : S DATE : S	e Alibi memory record Page 76 earch by Alibi number earch by date earch by Consecutive value						
NO : N ALL : T	oi memory records  No Transfer alibi memory record to the printer port						
[ 815 ALIBI ABOUT ] Transfer alib	oi memory information. Page 76						
NO : N YES : S	memory SD card.  Page 76  No Start formatting alibi SD card.  Attention: Only authorized person!!!						
[ 82- INFORMATION ] Press key	INFORMATION  or key again to enter this menu.  to go to the beginning of the sub-block or press key to n block.						
password w	rannounces interfering quantity to the instrument with service hen calibration switch enabled. Count number increases at exit mode if service password is used and calibration is enabled to mode.						
II 022 CONTIN III	ettable and protected counter announces interfering quantity iment. Count number increases at every exit from set-up						
[ 823 NEXT VERIFIC ] Date of the	next verification						

[9-- DIAGNOSTIC] Diagnostic Block

[9-	- DIAG	NOSTIC]	Diagr	ostic E	Bloc	:k
[	9	DIAGNOSTIC			]	DIAGNOSTIC MAIN BLOCK  Press key sequentially to access this main block,  or press or key to enter configuration parameters,  or press key to go to the next block,  or press key to exit from programming.
[	91-	HARDWARETES	ST		]	HARDWARE TESTING  Press key or key again to enter this menu.  Or press key to go to the next sub-block.
]	911	KEY			]	Key testing
[	912	RS232-1			]	RS232C-1 serial port testing
]	913	RS232-2			]	RS232C-2 serial port testing
]	914	RS485			]	RS485 serial port testing
[	915	USB			]	USB port testing
]	916	IN / OUT			]	Digital Input / Output testing
]	917	DISPLAY			]	Display testing
]	918	LC SIGNAL mV			]	Load cell signal measuring in millivolt (analogue load cells only)
[	918	Dig LC COUNTS			]	Internal Counts of RC3D Load Cells
]	919	PRINTER			]	Printer testing
[	92-	HISTORY			]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.
]	921	PEAK LOAD			]	The last 20 peak loads listed in this parameter.
[	922	UNDER LOGS			]	The last 20 under errors listed in this parameter.
]	923	ERROR LOGS			]	The last 20 errors listed in this parameter.
[	924	ENTRY LOGS			]	The last 20 Service/User entry listed in this parameter.
[	96-	BACKUP / RECO	OVE		]	Press key or key again to enter this menu.  Or press key to go to the next sub-block.
[	961	BACK UP	:	ALL	]	Backup the instrument to SD card.  ALL Backup of all the instrument parameter to SD Page 30 card.
[	962	RECOVER	·	RCPT	J	M Restore the instrument from SD card.  SETP Parameters of 1, 2 and 3 parameter groups.  CAL Parameter group 5 and calibration coefficients.  ALL All parameters and calibration  WARNING: CAL and ALL items can be loaded if the calibration dip switch is at ON position.

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[	963	WEB BACK UP	]	Back up the instrument to the PC via web service.  When you access this parameter via web service, the "Backup setting" button on the web service screen becomes visible to back up the	
[	964	WEB RESTORE	]	Restores the instrument from the PC via web service.  When you access this parameter via web service, the "Restore" button on the web service screen becomes visible to restore the instrument.	
[	97-	FIRMWARE	]	FIRMWARE INFORMATION  Press key or key again to enter this menu.  Or press key to go to the next sub-block.	
[	971	INSTRUMENT	]	XX.XX	
[	972	OPTION	]	XX.XX	
[	973	UPGRADE	]	M Firmware upgrade	
				Call Flintec service or dealer to upgrade.	
[	974	Dig LC Board	]	XX.XX (FT-111D only)	
[	99-	DEFAULT	]	Press key or key again to enter this menu.  Press key to go to the beginning of the sub-block or press key to go to beginning of the main-block.	
[	993	PARAMET DEF	]	M Load parameter's default (Calibration do not change)	
[	994	FACTORY DEF	]	M Load factory defaults	
[	995	FACTORY DEF	]	M Load default address to digital load cell. (only FT-111D)	
				The default address feature solves the problem and provides access to the load cell functions even if its address and its serial number are not known.  WARNING: The DLC must be disconnected from the network and connect as single.	

### 8.6 CALIBRATION

Please read this document carefully and select the parameter values which will fit your application before programming the instrument.

**Warning:** You cannot change the legally related parameter values and calibration after sealing the instrument in legal usage. Be sure you have done the proper adjustments before sealing the scale.

#### Scale definition

Before the calibration can be performed the capacity and resolution of the scale must be defined.

Press key at the [523 MAX / d] prompt and set the required capacity and resolution of the scale. Then continue with the following:

Calibration involves emptying the scale then placing a known test weight on an empty platform and allowing the FT-111 to capture values for zero and span. Calibration is performed as:

- 1. Press key at the [611 TEST WEIGHT] prompt to start the calibration.
- 2. At the [UNLOAD THE PAN] prompt, remove any weight on the platform, then press key.
- 3. The terminal automatically starts to capture zero and the [ WAIT ] message appears during zero adjustment.
- 4. The test weight value will be used for the calibration is seen on the display as [LOAD THE PAN] [XXXXXX] after zero adjustment. Enter the test weight value via keys. A minimum test load requirement is 20% of scale capacity for accurate calibration; FLINTEC recommends test load between 50% to 75% of the capacity.
- 5. Place the test weight on the scale.
- 6. Press key to start span calibration. [WAIT] message will be shown on the display 10 seconds while span calibration is being performed.

# 8.6.1 Linearity Correction

Because of the load cell non-linearity or mechanical scale hardware, you may see nonlinearity on the scale performance. Multipoint calibration in this parameter improves the scale performance.

- 1. Press key at the [612 LINEARIZATIO ] prompt to start the calibration.
- 2. At the [UNLOAD THE PAN] prompt, remove any weight on the platform, then press key.
- 3. The terminal automatically starts to capture zero and the [ WAIT ] message appears during zero adjustment.
- 4. At the [LOAD 1] [XXXXXX ] prompt, the test weight value to be used for the first step calibration is seen on the display. A test load requirement is between 35% to 60% of the scale capacity.
- 5. Place the test weights or another practical weight on the scale and enter the test weight value via keys
- 6. Press key to start span calibration. [WAIT] message will be shown on the display 10 seconds while the first span calibration is being performed.
- 7. At the [LOAD 2] [XXXXXX ] prompt, the test weight value will be used for the second step calibration is seen on the display. Use the test weight equal to at least 90% of the scale capacity, preferably to the scale capacity
- 8. Place the test weights or another practical weight on the scale and enter the test weight value via keys.
- 9. Press to start second step span calibration. [WAIT] message will be shown on the display 10 seconds while the span calibration is being performed.

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## 8.6.2 Zero and Span Adjustments

In this sub-block you can only perform zero adjustment or span adjustment automatically without performing full calibration. Do not perform span calibration if eCal electronic calibration.

#### **Zero Adjustment**

- 1. Press key at the [ 621 ZERO ADJUSTM ] prompt to start the zero adjustment.
- 2. At the [UNLOAD THE PAN] prompt, remove any weight on the platform, then press key.
- 3. The terminal automatically starts to capture zero and the [ WAIT ] message appears during zero adjustment.

#### Span Adjustment

- 1. Press key at the [ 622 SPAN ADJUSTM ] prompt to start the span adjustment.
- 2. At the [LOAD THE SCALE] [XXXXXX ] prompt, the test weight value will be used for the calibration seen on the display. Enter the test weight value via keys. A minimum test load requirement is 20% of scale capacity for accurate calibration; FLINTEC recommends test load between 50% to 75% of the capacity.
- 3. Place the test weights on the scale.
- 4. Press to start span calibration. [ WAIT ] message will be shown on the display 10 seconds during span calibration.

#### Span Adjustment under load

This parameter is being used to perform span adjustment of a scale without lifting the load on it. This operation especially used for span adjustment tank / silo which have some material in it. You can make span adjustment without emptying the tank.

- 1. Press key at the [ 623 S UNDER LOAD ] prompt to start the span adjustment under load.
- 2. [ P.ZERO ] prompt appears on the display to indicate the scale load will be determined as temporary zero.
- 3. Press key and the display will show [WAIT] message during temporary zero adjustment.
- 4. At the [LOAD THE SCALE] [XXXXXX] prompt, the test weight value will be used for the calibration is seen on the display. Enter the test weight value via keys. A minimum test load requirement is 20% of scale capacity for accurate calibration. FLINTEC recommends test load between 50% to 75% of the capacity. Sum of the preload of the scale and test weight must be less than capacity.
- 5. Place the test weights on the scale.
- 6. Press to start span calibration. [WAIT] message will be shown on the display 10 seconds during span calibration.
- 7. Zero adjustment is recommended after emptying the scale.

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### 8.6.3 eCal Electronic Calibration

**IMPORTANT NOTE:** The eCal electronic calibration is based on the zero adjustment by entering the dead load value or automatic zero adjustment and span adjustment by entering the load cell data.

WARNING: If the primary unit is no kg, the selected unit should be saved by exit from set-up and then perform e-Cal.

- 1. Full calibration cancels the eCal performed before.
- 2. Span adjustment cancels the eCal performed before.
- 3. Gravity adjustment cannot be done after eCal.
- 4. "Span adjustment under load" cannot be done after eCal.

This parameter lets you perform calibration without using any test weights. A/D coefficients of the indicator are adjusted in production for increasing eCal accuracy. The calibration coefficients are calculated by scale capacity, total load cell capacity, load cell full scale output and estimated dead load. If the conditions are convenient for zero calibration, you may perform automatic zero adjustment instead of entering estimated preload.

### [TOTAL LC CAPACIT ] [XXXXXX]

Enter total load cell capacity via keys and press key to go to the next step. Example: If the weighing system has 4 pcs 1000 kg load cell, enter 4000.

#### [AVARAGE LC OUT ] [XXXXXX]

Enter load cell output in mV/V via keys. If the weighing system has more than one load cell, calculate the mean value of load cells outputs mV/V indicated on the certificates of the load cells. Press key to go to the next step.

Example: If load cell outputs are LC1: 2.0010, LC2: 1.9998, LC3:1.9986 and LC4:2.0002, the mean value will be; Mean of LC outputs =  $(2.0010 + 1.9998 + 1.9986 + 2.0002) \div 4 = 1.9999 \text{ mV/V}$ .

#### **[ZERO ADJUST ]**

If the scale is empty and you want to make automatic zero adjustment instead of entering estimated dead load (see next step ), press key appears [ UNLOAD THE PAN ] and press key to start zero calibration after unloading the scale. The display will show [ WAIT ] message during zero adjustment. In this while the scale must be unloaded and stable. Approximately 10 seconds later electronic calibration is performed.

If the scale is not empty or you prefer to enter estimated preload value, press the key before pressing the key.

#### [ESTIM DEAD LOAD] [XXXXXX]

Enter the dead load value of the weighing system in current unit by using keys. Press the key to go to the next step.

### Notes

Dead load correction: You may change the dead load value after testing the scale and adding the displayed gross weight value of unloaded scale to the dead load value. Do not press key after switching on the instrument after calibration and the power on zero and automatic zero tracking should be disabled to determine the dead load error. Dead load value is cancelled after automatic zero adjustment.

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# 8.6.4 Gravity adjustment

**WARNING:** This parameter should ONLY be used at the scale that will be initially verified in two stages by gravity adjustment in legal metrological applications.

The gravity acceleration values of the place of the calibration and of the place of the usage are entered in this parameter.

- 1. Press key to access this parameter.
- 2. [624 GRAVITY CAL: 9.80255] prompt seen. Enter the gravity acceleration value of the calibration place. Confirm with key.
- 3. [625 GRAVITY USAG: 9.80255] prompt seen after pressing key. Enter the gravity acceleration value of the place of the usage.
- 4. Confirm with key.

### 8.6.5 Calibration coefficients

Calibration coefficients are calculated after calibration and saved into the memory for usage until next calibration. Note these coefficients to use them in case of calibration lost. Changing them slightly improves the scale accuracy without recalibration. Entering these values to another indicator may cause slightly reducing the weighing accuracy due to offset differences between two analogue digital circuits.

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# 9 DIGITAL LOAD CELLS (DLC)

For the pin configuration of the digital load cells RC3D please see **page 20.** It is possible to connect all RC3D load cells to the terminal and address them later.

### 9.1 Addressing of Digital Load cells

**IMPORTANT NOTE:** For addressing all digital load cells RC3D can be connected.

The following diagram shows the recommended load cell addressing principle. Remember, if pair shift adjustment is selected, 1 and 2, 3 and 4 etc. will be sectional pairs.

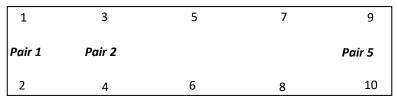


Figure 9.1 - The addressing principle of RC3D.

# Addressing of RC3D digital load cells

- 1. Press key at the [533 ADDRESSING] prompt to start the addressing.
- 2. The message [ WAIT ] appears for a short time and then [ DLC NUMBER :01 ] appears. Here 01 is the address of the DLC.
- 3. Press key to enter the serial number of the first DLC.
- 4. After the [SERIAL: ] prompt appears, type the serial number by pressing key to increase or key to decrease the blanking digit and press key to select the next digit.
- 5. Press key to start addressing of the digital load cell. [ADDRESSING DLC] message appears on the display for 10 seconds while addressing is being performed.
- 6. The next DLC number appears on the display. Press key to enter the serial number and repeat from item 4 until all DLCs have been addressed.
- 7. [532 QUANTITY:XY] message appears after addressing of all load cells.
- 8. Press key to access the "Shift adjustment" block or press key until [SAVE : YES] prompt appears on the display and press key to save the changes.

**IMPORTANT NOTE:** If the [E81 CANNOT ADDR] error message comes across during addressing, set the digital load cell to its default settings, and try addressing again. Refer to Parameter 995.

#### Addressing of RC3D digital load cells manually

The manual addressing helps to change any load cell or to change the instrument without performing shift adjustment and calibration. To address any load cell manually,

- 1. Press key at the [533 ADDRESSING] prompt to start the addressing.
- 2. The message [ WAIT ] appears for a short time and then [ DLC NUMBER :01 ] message appears to indicate load cell address.
- 3. Press key until the address of the new load cell to be installed appears.
- 4. Connect the new load cell.
- 5. Press key to start addressing of the load cell.
- 6. Enter the serial number of the load cell by pressing key to increase or key to decrease the blanking digit and press key to select the next digit. Press key to address the load cell.
- 7. After the following DLC number has appeared on the display, press key and the message [ 532 QUANTITY :XY ] appears.
- 8. Press key to access to Shift adjustment block or press key until [ SAVE : YES ] prompt appears on the display and press key to save the changes.

# Shift adjustment method (corner adjustment)

A shift adjustment is carried out to eliminate weight reading differences placing a load on different positions on the platform. A calibration is required after shift adjustment.

Each load cell or each sectional pair should be loaded for eccentricity adjustment. Individual shift adjustment is used to eliminate errors in installations that have excessive eccentricity errors. Typical application of sectional pairs are rolling loads on the platform like track scales. Sectional pairs adjustment is easier and faster.

# **Automatic Shift Adjustment**

**IMPORTANT NOTE**: This adjustment must be performed before calibration. Load the scale few times before performing automatic shift adjustment.

Small mismatches in mechanical and electronic gain of the load sensing paths can cause the same test weight to produce slightly different readings, depending on the location of the test weight on the scale. To eliminate these eccentricity errors, shift adjustment is performed as

- 1. Press key at the [ 542 AUTO ADJUST ] prompt to start the shift adjustment.
- 2. At the [ZERO CALIBRATION] prompt, press key to go to next step.
- 3. [ UNLOAD THE PAN] prompt, remove any weight on the platform, then press key.
- 4. The terminal automatically starts to capture zero and the [ WAIT ] message indicating the operation is in progress.
- 5. After the [LOAD DLC NO: 01] or [LOAD PAIR NO: 01] prompt, place the weight of at least 10% of the DLC capacity as close as possible to the independent load cell or sectional pair 01. Press key.
- 6. The terminal automatically starts to capture the values from DLCs and the [ WAIT ] message indicating the operation is in progress.
- 7. The following load cell address or pairs number appears on the display and you may repeat from item 5 until all DLCs have been adjusted.
- 8. After end of adjustment the following sub-block appears.

# **Manual Shift Adjustment**

**IMPORTANT NOTE**: The shift adjustment must be performed before calibration.

Manual shift adjustment is done to improve small shift errors manually entering shift coefficients of load cells after the instrument has been changed.

- 1. Press key at the [543 MANUAL ADJUS] prompt to start the manual shift adjustment.
- 2. At the [DLC COEFF:01] and [1.0000] prompt, enter the coefficient by pressing key to increase or key to decrease the blanking digit and press key to select next digit. Press key change to the next DLC
- 3. After entering the value of the last coefficient press key to check values again or press key to exit.
- 4. Press key until [ SAVE : YES ] prompt appears on the display. Press key to save the changes.

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## **Setting Shift Coefficients of all Load cells to 1**

Setting all coefficients to 1 temporary might be needed to service the scale without losing the shift coefficients.

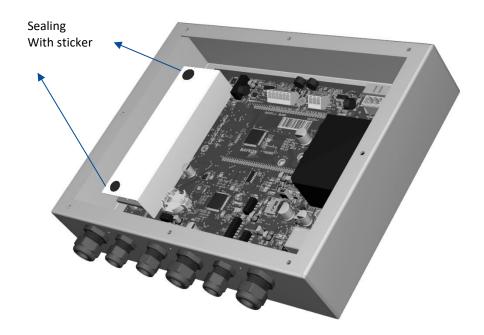
- 1. Press key at the [ 544 SET TO 1 : NO ] prompt to adjust the parameter.
- 2. Parameter changes to [ 544 SET TO 1 : YES ], press key until [ SAVE : YES ] prompt appears on the display.
- 3. Press key to save the changes.

Do not forget to reload coefficients after testing the scale as;

- 1. Press key at the [ 544 SET TO 1 : YES ] prompt to adjust the parameter.
- 2. Parameter changes to [ 544 SET TO 1 : NO ], press key until [ SAVE : YES ] prompt appears on the display.
- 3. Press key to save the changes into the memory.

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# **10 SEALING OF APPROVED SCALE**



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## 11 OPTIONAL BOARDS

## 11.1 DIGITAL INPUTS AND OUTPUTS

**APPLICATION**: Digital inputs are used to control the instrument and the digital outputs can be used to control gates, valves etc. or to produce alarm. Refer to section 6 for details.

**CONDITION**: The Digital I/O option board, analogue output option or one of the fieldbus option should be installed in the weighing terminal, to use digital control inputs and set point output signals.

This weighing terminal can be equipped with programmable 4 inputs and 5 outputs to use them at weighing process. If the specified set point values are exceeded or dropped below, digital outputs are set, e.g., for controlling flaps, valves, lambs etc.

## Entry the set point values

- 1. Press the SP key.
- 2. The set point 1 value appears on the display as value is seen on the display [SP 1 1250 kg].
- 3. Press key to increase or press key to decrease the blanking digit and press key to select digit.

  You may press key to enter negative set point value. Press the key to save it and to go to the next set point.
- 4. Repeat from step 2 for entering following set points.
- 5. FT-111 returns to the operation after displaying set point 5 and entering its value,
- 6. Press key to return operation at any step.

### **Digital Inputs**

FT-111 digital inputs are independently programmable for zeroing, taring, clear, print, key lock and as a fieldbus Remote input in industrial weighing applications. Input connection diagram is shown in Figure 11.1.

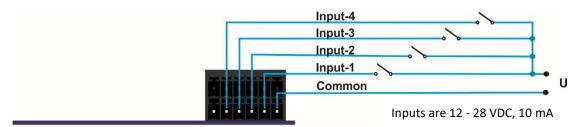


Figure 11.1 - Connection diagram of digital inputs

### **Digital Outputs**

FT-111 instrument's digital outputs can be programmable as a free set point, as a control mode or as a remote output at basic weighing. Output connection diagram is shown in Figure 11.2.

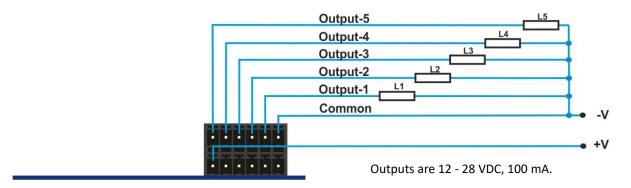


Figure 11.2 - Connection diagram of digital outputs

### 11.2 ALIBI MEMORY

### **RELATED PARAMETERS:** Main block 8--

You can fulfil your weight data recording obligations with the alibi memory in certified operation without having paper archive. The weight data is saved into the alibi memory after every weighing operation together with date and time. The alibi record number may also be found on the printout data.

The alibi memory recording principle is a loop memory which is deletes the oldest record after the capacity limit 99 999 reached to overwrite the latest weighing. You can quickly access to the record of specific weighing by entering the suitable search criteria.

### 11.2.1 Installation of Alibi SD card

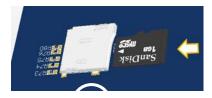
Alibi memory requires the Alibi SD card at the SD1 card slot which is between load cell terminal and metal box of the analogue digital converter as shown in the pictures below. If you install the alibi memory SD card, order Alibi SD pack from Flintec or dealer.



Figure 11.3- Location of Alibi SD card slot

### Inserting or removing the Alibi SD card

- 1. De-energize the instrument and wait 30 seconds before interfering with the instrument in safe area.
- 2. Remove screws of the backplane.
- 3. The location of the alibi card is between load cell terminal and metal box of the analogue digital converter which is named as SD1.
- 4. Insert the Alibi SD card into the slot until it locks into place. Or remove the SD card by pressing it gently. Do not use screwdriver to install or remove SD card.



- 5. Mount the backplane to the body.
- 6. Energize the instrument.

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## 11.2.2 Activating Alibi Memory

- 1. Go to the parameter [ 8-- METROLOGY] main block in set up.
- 2. Press key 2 times to access parameter 811.
- 3. Press key after selecting YES in the parameter.
- 4. Press key until [ SAVE : YES ] prompt seen on the display and press key to save the changes into the memory. [ E42 NEW ALIBI ] message appears.
- 5. Re-enter the set-up and format the SD memory card in parameter 816.
- 6. Press key until [SAVE: YES] prompt seen on the display and press key to exit from set up

## 11.2.3 How is the Data Recorded into the Alibi Memory?

After the following actions the transferred data is recorded into the alibi memory:

- 1. Press key to print the label,
- 2. Automatic printing (automatic print data transferring),
- 3. Interface command ASCII < P >,
- 4. BSI commands which request the stable weight,
- 5. Print commands of fieldbus interfaces,

## 11.2.4 Recall Data from Alibi Memory

RELATED PARAMETERS: Main block 8--.

You can fulfil your weight data recording obligations with the alibi memory in certified operation without having paper archive. The weight data is saved into the alibi memory after every weighing operation together with date and time. The alibi record number may also be found on the printout data.

After the following actions the data is recorded into the alibi memory:

- 1. Press key to print the label,
- 2. Automatic printing (automatic data transferring),
- 3. Interface command ASCII < P >,
- 4. BSI commands which request the stable weight,
- 5. Print commands of fieldbus interfaces,
- 6. Digital < Print > input.

The alibi memory recording principle is a loop memory which deletes the oldest record after the capacity limit 99 999 has been reached to overwrite the latest weighing. You can quickly access to the record of specific weighing by entering the suitable search criteria.

To access the alibi memory enter the "Metrology main block" in the programming menu . Refer to page 64. Then select one of the suitable criteria:

Alibi record number, date, net weight, gross weight or tare weight. You can also transfer all alibi memory records to your PC.

### Access to Alibi records:

- 1. Go to the parameter [8-- METROLOGY] main block in set up.
- 2. Press key 3 times and key to access parameter 813.
- 3. Select the suitable criteria by pressing keys which are NUM (Alibi number), DATE (weighing date) or CN (consecutive number).

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### Alibi records displaying sequence on the display:

The alibi record of the selected weighing is displayed in the sequence below.

- 1. Alibi record number
- 2. Date
- 3. Consecutive number

### Search with Alibi record number:

- 1. Press key after selecting NUM in parameter 813.
- 2. After entering alibi number in the printout data press key. You may navigate in the alibi memory with or keys after entering alibi number.
- 3. The weighing data in the alibi memory is indicated on the display.
- 4. Press key to print this record and the previous nine weighing.
- 5. Press key 4 times to return operation.

### Search with date:

- 1. Press key after selecting DATE in parameter 813.
- 2. After entering alibi number in the printout data press key. The date format entry should be as in the operation. e.g., date entry should be DDMMYY if parameter 251 is set to DMY. You may navigate in the alibi memory with or keys after entering the date.
- 3. The weighing data in the alibi memory is indicated on the display.
- 4. Press key to print this record and the previous nine weighing.
- 5. Press key 4 times to return operation.

### **Transfer all Alibi records:**

- 1. Go to the parameter [8-- METROLOGY] main block in set up.
- 2. Press key 2 times and key 3 times to access parameter 814.
- 3. Press key to select PRNT and press key to start transferring.
- 4. Or you may stop transferring by pressing key.

## **About Alibi Memory:**

- 1. Go to the parameter [8-- METROLOGY] main block in set up.
- 2. Press key 2 times and key 4 times to access parameter 815.
- 3. Press key to print alibi information.

### Format Alibi Memory:

**Warning:** Alibi memory formatting should be done by authorized person. Otherwise erasing alibi memory may bring you undesired legal responsibility.

Warning: Alibi memory should not be inserted to the PC.

You may need to format alibi memory after installing the used SD card into the instrument to erase previous records before starting usage in legal or to erase alibi memory if you don't need previous records legally etc. This process requires the calibration switch in programming position.

- 1. Go to the parameter [ 8-- METROLOGY ] main block in set up.
- 2. Press key 2 times and key 5 times to access parameter 816.
- 3. Select YES and press key.
- 4. The warning prompt [ ARE YOU SURE? ] appears on the display.
- 5. Press key to start formatting or press key to escape.
- 6. Press key 3 times to return operation.

The empty fields are indicated as [------] and transferred as [NO RECORD]; and the corrupted records are indicated as [ Error ] and transferred as [ CORRUPTED ].

## 11.3 Installation of SD Card

Some features of the FT-111 need to be inserted into the SD card located close to the USB connector on the main board which is named as SD2. Some options might be activated by SD pack which should be supplied from Flintec. Up to 16 GB standard SD cards can be used for data logging and backup & restore the setup.

### Inserting the SD card

- 1. De-energize the instrument and wait 30 seconds before interfering with the instrument in safe area.
- 2. Remove screws of the backplane.
- 3. Insert the SD card into the slot until it locks into place. Do not use screwdriver to install SD card.



- 4. Mount the backplane to the body.
- 5. Energize the instrument. FT-111 read the SD card at power on to initiate its function.

## Removing the SD card

- 1. De-energize the instrument and wait 30 seconds before interfering the instrument in safe area.
- 2. Remove screws of the backplane.
- 3. Remove the SD card by pressing it gently as shown in the pictures below. Do not use screwdriver to remove SD card.



- 4. Insert the new SD card as described above, if need be.
- 5. Mount the backplane to the body.
- 6. Energize the instrument.

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## 11.4 BSI PROTOCOL TO INTERFACE WITH PC AND PLC

New generation FLINTEC weighing terminals launched on the market support the standardized command set BSI (Flintec Serial Interface) data form, depending on the functionality of the instrument. This easy data format gives the reliable and speedy interface advantages with communicating PLC or PC for process control or transactional applications. FT-111 has BSI-Base commend set as described in this section.

### **General Rules:**

1.	Commands are only in CAPITAL.
2.	CHK (2 ASCII char) can be enabled or disabled from both command and response.
3.	Weight data and set point values are 8-byte with dot and non-significant zeros on the left.
4.	Address (2 ASCII char) will be located in the structure, if not 00.

### Command format:

A general description of the command is as follows [ADR][COMMAND][CHK][CR][LF]

Response format with weight:

A general description of the response is as follows [ADR][COMMAND][STATUS][SIGN][WEIGHT][CHK][CR][LF]

Response format without weight:
[ADR][COMMAND][STATUS][CHK][CR][LF]

Note: CHK, CR and LF will not be shown in below data format descriptions in this section.

### **Status Table**

The status data in the interfacing are listed below

A	Ack, the command is operated successfully
D	Dynamic, unstable weight
E	Errors except of H, L, O, +,
Н	High voltage detected
I	The weight is in range
L	Low voltage detected
M	Mean (Average)
N	Nack, the command couldn't be operated
0	ADC out
S	Stable weight
X	Syntax error ( not recognized the received command )
+	Overload
_	Underload

## **Checksum Calculation**

CHK is transmitted as two ASCII characters calculated with the Checksum formulation. Checksum = 0 – (SUM of all response data before CHK)

**Example:** Read stable current weight data.

BSI Examples: (CHK is enabled, and instrument address is 01)

Command: 01P[CHK][CR][LF]

Checksum = 0 - (0x30 + 0x31 + 0x50)

= 0 - 0XB1 = 0x4F

= Char '4' and 'F'

Response: 01PS+000123.4[CHK][CR][LF]

Checksum = 0 - (0x30 + 0x31 + 0x50 + 0x53 + 0x2B + 0x30 + 0x30 + 0x31 + 0x32 + 0x33 + 0x31 + 0x30 + 0x31 + 0x30 + 0x31 + 0x30 + 0x31 + 0x30 
0x2E + 0x34) = 0 - 0x02B7= 0x49

= Char '4' and Char '9'

## 11.4.1 BSI-Base Commands

## **BSI-BASE Command Table:**

Description	Command	Response
Read all weight data	[ADR][A]	[ADR][A][STATUS][SIGN][NET W]
immediately		[SIGN][TARE W] [SIGN] [GROSS W]
Read Gross weight value	[ADR][B]	[ADR][B][STATUS][SIGN][WEIGHT VALUE]
immediately		
Clear the tare memory	[ADR][C]	[ADR][C][A]
Read the last printed data	[ADR][DO]	[ single line data format ]
Print the label	[ADR][DJ]	[ADR][DJ][A]
Read stable weight and Record	[ADR][DV]	[ADR][DV][A][STATUS][SIGN][NET W]
to Alibi		[SIGN][TARE W][SIGN] [GROSS W] [ALIBI
		NUMBER]
Erase all data loggings on the	[ADR][E]	[ADR][E][A]
SD card.		(100)(10)
Start / stop continuous data	[ADR][F] [X]	[ADR][F][A]
output	X=0; Disable	
	X=1; Enable	
Read voltage value of DC power	[ADR][G]	[ADR][G][STATUS][VOLTAGE VALUE]
supply  Read current weight (indicated)	[ADR][I]	[ADR][i][STATUS][SIGN][WEIGHT VALUE]
value immediately	[ADK][i]	[ADK][i][STATOS][SIGN][WEIGHT VALUE]
Read all data logging in the SD	[ADR][L]	[ADR][L][A][AII DATA]
card		
Read the scale name	[ADR][N]	[ADR][N][A][16 digits]
	[]	[
Read the stable weight	[ADR][P]	[ADR][P][STATUS][SIGN][WEIGHT VALUE]
Load set points	[ADR][Q][SP No][L][SIGN][SP	[ADR][Q][STATUS]
	VALUE]	
Read set points	[ADR][R][SP No][L]	[ADR][R][STATUS][SIGN][SP VALUE]
Read Status	[ADR][S]	[ADR][S][STATUS-1][STATUS-2] [STATUS-3]
Tare	[ADR][T]	[ADR][T][STATUS]
Read digital inputs	[ADR][U]	[ADR][U][STATUS][Inputs]
Read digital outputs	[ADR][V]	[ADR][V][STATUS][Outputs]
Set/Reset digital outputs	[ADR][W][Outputs]	[ADR][W][STATUS]
Read weight value in increased resolution	[ADR][X]	[ADR][X][STATUS][SIGN][WEIGHT VALUE]
Zero	[ADR][Z]	[ADR][Z][STATUS]

### **BSI-Base Commands and Responses:**

Read all weight data immediately
Read Gross weight value immediately
Clear the tare
Read the last printed data
Print the label
Read stable weight and Record to Alibi
Erase the logs in the SD card.
Start /stop continuous data output
Read voltage value of DC power supply
Read current weight (indicated) value immediately
Read the logs in the SD card.
Read the scale name
Read the current stable weight value
Load set point values
Read set point values
Read Status
Tare
Read digital inputs
Read digital outputs
Set/Reset digital outputs
Read current weight value in increased resolution immediately
Zero

Α	Read all weight data
---	----------------------

Command : [ADR][A]

Response : [ADR][A][STATUS][SIGN][NET W][SIGN][TARE W][SIGN][GROSS W]

Example:

Command : 01A

Response : 01AS+000123.4+000111.1+000234.5

01AD+000123.4+000111.1+000234.5 01AO (ADC out error )

Comments :

The response is net, tare and gross weight values or error status.

All weight data is transmitted immediately after receiving the command.

В		Read Gross weight
Command	:	[ADR][B]
Response		[ADR][R][STATUS][SIGN][WEIGHT VALUE]

Example:

Command : 01B

Response : 01BS+000123.4 (gross weight is stable and 123.4)

01BD+000123.4 (gross weight is dynamic and 123.4)

01B- (under load)

Comments

The response is the gross weight value (stable or dynamic) or error status. Gross weight data is transmitted immediately after receiving command.

C Clear the tare memory

[ADR][C] Command

[ADR][C][A] Response (Cleared and the scale is in gross mode)

Comments:

The response status is always Ack in weighing or force mode.

DO Read the last printed data

Command [ADR][DO]

[single line data format] Response

Example:

Command: 01DO

Response: G: 53.55kg T: 0.00kg N: 53.55kg

Comments:

The last printed values are transmitted immediately after receiving the command.

Single line data format can be change due to its configuration. Refer to section 7.3 and sub-block [16].

DJ Print the label

Command [ADR][DJ]

Response [ADR][DJ][STATUS]

Example:

Command : 01DJ

Response (Weight is stable and printed) or : 01DJA

> 01DJN (Could not print)

Comments:

Checks status and it must be stable. Else Nack status is send.

Status can be Stable or Nack.

DV Read stable weight and Record to Alibi

Command [ADR][DV]

Response [ADR][DV][STATUS][SIGN][NET W][SIGN][TARE W][SIGN][GROSS W][ALIBI NUMBER]

Example:

Command

: 01DVS+000123.4+000111.1+000234.5\*00001\* Response

> 01DVO (ADC out error)

Comments

The response is net, tare, gross weight and alibi number values or error status.

All weight data is transmitted immediately after receiving the command if weight is stable.

E Erase the all data logging in the SD card

Command [ADR][E]

Response [ADR][E][STATUS]

Example:

Command : 01E

Response :01EA (All data logging erased) or

01EN (Data logging could not erased)

Comments:

Acknowledge (ACK) is transmitted after all data logging erased.

F Start /stop continuous data output

[ADR][F][ENABLE/DISABLE] Command :

[ADR][F][STATUS] Response

Example:

Command : 01F1 (Enable)

> 01F0 (Disable)

Response :01FA (Command is done successfully)

> 01FN (Command could not executed)

Comments: Indicated weight value sends continuously.

Continuous data format is [ADR][I][STATUS][SIGN][WEIGHT VALUE].

L Read the all data logging in the SD card

Command : [ADR][L]

Response : [ADR][L][ ALL DATA]

Example:

Command : 01L

Response : 01LA[ALL DATA] (All data logging is sending) or

01LN (SD card could not read or there is no SD card)

Comments: All data logging sends after acknowledging (ACK).

N Read the scale name

Command : [ADR][N]

Response : [ADR][N][STATUS][ 16 digits ]

Example:

Command : 01N

Response : 01NASCALE-1 (Scale name is SCALE-1)

Comment: Scale name is transmitted immediately after receiving command.

**G** Read voltage value of DC power supply

Command : [ADR][G]

Response : [ADR][G][STATUS][VOLTAGE VALUE]

Example:

Command : 01G

Response : 01GA234 (Power supply is 23.4 VDC)

01GA150 (Power supply is 15.0 VDC)

Comments: Voltage value is 3-byte and sends with 0.1 V increment.

I Read indicated weight

Command : [ADR][I]

Response : [ADR][I][STATUS][SIGN][WEIGHT VALUE]

Example:

Command : 01I

Response : 01IS+000123.4 (Weight is stable and 123.4)

01ID+000123.4 (Weight is dynamic and 123.4)

01I+ (Overload)

Comments:

Indicated weight value (stable or dynamic) is transmitted immediately.

The weight value may be in gross or net.

P Read the stable weight

Command : [ADR][P]

Response : [ADR][P][STATUS][SIGN][WEIGHT VALUE]

Example:

Command : 01P

Response : 01PS+000123.4 (Weight is stable and 123.4) or

01PN (Could not print)

Comments:

Checks status and it must be stable. Else Nack status is send.

Status can be Stable or Nack.

Q Load set points

Command : [ADR][Q][SET No][L][SIGN][SP VALUE]

Response : [ADR][Q][STATUS]

Example:

Command : 01Q01L+000123.4

Response : 01QA (123.4 loaded to SP1)

01QN (Could not loaded)

01QX (Decimal point of SP VALUE is mismatch)

Comments :

SP Number is 2-byte ASCII char. Use 01 for SP1, 02 for SP2 and 03 for SP3.

SP VALUE data is 8-byte ASCII char with dot and non-significant zeros on the left.

R Read set points

Command : [ADR][R][SP No][L]

Response : [ADR][R][STATUS][SIGN][SP VALUE]

Example:

Command : 01R01L

Response : 01RA+000123.4 (SP1 is 123.4)

01RN (Could not loaded)

Comments:

SP No is 2-byte ASCII char. Use 01 for SP1, 02 for SP2 and 03 for SP3.

SP VALUE data is 8-byte ASCII char with dot and non-significant zeros on the left.

S Read Status
Command : [ADR][S]

Response : [ADR][S][STATUS-1][STATUS-2][STATUS-3]

Example:

Command : 01S

Response : 01SSGI (Stable, Gross, In Range)

01SDGL (Dynamic, Gross, Low voltage error)

Comments:

The response includes 3 status information.

STATUS-1 can be Stable or Dynamic.

STATUS-2 can be Gross or Net.

STATUS-3 can be 'In range', 'Out of range', '+ Over', '- Under', 'Low voltage', 'High voltage' or 'Errors'.

T Tare

Command : [ADR][T]

Response : [ADR][T][A] (Taring is done successfully and scale is in net)

[ADR][T][N] (Taring could not executed)

[ADR][T][X] (Taring is disabled)

Comments:

The tare value is overwritten by the new tare weight value.

Status must be stable in 2 seconds time out delay. If so, Ack is send.

If it cannot be stable in time out delay, Nack is send.

U Read digital inputs

Command : [ADR][U]

Response : [ADR][U][STATUS][Inputs]

Example:

Command : 01U

Response : 01UA03 (Input 2 and Input 1 are active)

01UA96 (Input 8,5,3,2 are active)
01UAFF (All 8 inputs are active)
01UN (Could not read inputs)

Comments:

Data lengths change according to number of digital inputs.

Inputs are implemented to ASCII char of 4-bit. '1111' inputs are implemented to char 'F'.

INPUTS	8-NI	IN-7	9-NI	IN-5	1N-4	IN-3	IN-2	IN-1
Bit wise	1	0	0	1	0	1	1	0
ASCII	9				6			

V Read digital outputs

Command : [ADR][V]

Response : [ADR][V][STATUS][Outputs]

Example:

Command : 01V

Response : 01VA03 (Output 2 and Output 1 are active)

01VA96 (Output 8,5,3,2 are active)

01VAFF (All 8 outputs are active)

01VN (Could not read outputs)

### Comments:

Data lengths change according to number of digital outputs.

Outputs are implemented to ASCII char of 4-bit. '1111' is implemented to char 'F'.

OUTPUTS	8-TUO	0UT-7	9-TUO	OUT-5	OUT-4	OUT-3	OUT-2	OUT-1
Bit wise	1	0	0	1	0	1	1	0
ASCII	9			•	6			

**W** Write ( Set/Reset ) digital outputs

Command : [ADR][W][Outputs] Response : [ADR][W][STATUS]

Example:

Command : 01W96

Response : 01WA (Outputs 8,5,3,2 are activated)
01WN (Outputs could not be activated)

### Comments:

Data lengths change according to number of digital outputs.

Outputs are implemented to ASCII char of 4-bit. '1111' outputs are implemented to char F'.

The parameter of output must be programmed as 'FBUS' for this feature (Page 59).

OUTPUTS	0UT-8	0UT-7	0UT-6	OUT-5	OUT-4	OUT-3	OUT-2	OUT-1
Bit wise	1	0	0	1	0	1	1	0
ASCII	9		•	•	6			

X Read weight value in increased resolution

Command : [ADR][X]

Response : [ADR][X][STATUS][SIGN][WEIGHT VALUE]

Example:

Command : 01X

Response : 01XS+00123.41 (weight is stable and 123.41) or

01XD+00123.41 (weight is dynamic and 123.41) or

01XE (Error)

Comments: The response includes weight data with divided the increment to 10.

**Z** Zero

Command : [ADR][Z]

Response : [ADR][Z][A] (Zeroed)

[ADR][Z][N] (Zeroing could not be operated)

[ADR][Z][X] (Zeroing is disabled)

Comments

Zero command cannot work in net weighing.

Weight must be in zeroing range for all operating modes.

Status must be stable in 2 seconds time out delay. If so, Ack is send.

If it cannot be stable in time out delay, Nack is send.

## 11.5 CONTINUOUS DATA FORMATS

**RELATED PARAMETERS:** Parameters 111, 121, 131 and 141.

Continuous data output can be programmed to some common formats besides Flintec continuous formats. To select one of the described formats below press the key sequentially. Press key to go to the next parameter.

### Flintec ®

Cha num	racter nber	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Des	cription	otion STX STA STB STC Indicated weight					Tare weight					CR	LF	СНК						
ple-	ASCII	•	}	1	0			0	7	5	0				2	5	0			•
Example	Hex	02	7D	31	30	20	20	30	37	35	30	20	20	20	32	35	30	0D	0A	06

Function	Descrip	tion											
STX	Start of	ftransm	issior	n cha	aract	er.							
	Bit 7	Bit 6	Bit	5	Bits	4 a	nd 3		Bit	s 2,1 a	nd (	)	
					4	3	Incren	nent	2	1	0	Decim	al point
					0	1	x 1		0	0	0	XXXX0	
					1	0	x 2		0	0	1	XXXXX	
STA (STATILIS A)					1	1	x 5		0	1	0	XXXXX	
(STATUS A)									0	1	1	XXXXX	
	0	<b>H</b>	5	-					1	0	0	XXXX.X	
	Always 0	Always		AIWdys I					1	1	0	XX.XXX	
	₽	₹	- 2	₹					1	1	1	X.XXX	
	Bit 7	Bit 6		Bit	5	Е	Bit 4	Bit 3		Bit 2	<u> </u>	Bit 1	Bit 0
STB (STATUS B)	Always 0		zeroed on zerp		Always 1		Always 1	0 = Stable		0 = No 1 = Error (1)	0	0 = Weight 0 = Weight positive	0 = Gross 1= Net
STC (STATUS C)	Always	0 as AS	CII ( 3	0 he	ex ).								
Indicated Weight		seven ch cimal po		ers	are a	stri	ng conta	aining t	he c	current	we	ight not in	cluding
Tare Weight	These s		aract	ers	are a	stri	ng conta	aining t	he t	are we	ight	t not includ	ding the
CR	Carrige	Return.											
LF	Line Fe	ed.											
СНК	1	-					ulation is STATUS		+	LF)			

<sup>(1)</sup> Error Messages: UNDER, OVER, A.OUT, L-VOLT and TILT are represented in Indicated data fields as left aligned.

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## $\mathsf{HBM}^{^{\otimes}}$

Description	STX	Sign	Indica	ited w	eight/	;				<b>N</b> 1	S2	S3	S4	Unit		ETX
Example	•				0		7	5	0	N			1	k	g	<b>~</b>

## Toledo®

Description	STX	А	В	С	Indica	ated v	veight	t			Tare v	veight				CR	LF	СНК
Example	•	}	1	0			0	7	5	0			2	5	0			•

## $\mathsf{SysTec}^{\circ}$

Description	Statu	S	Indica	ited w	eight/							SP	Unit		CR	LF
Example	S						0	•	7	5	0		k	g		

## SMA

Description	LF	S	R	N	M	F	Indica	ated v	weigh	it					Unit		CR
Example			1	N							0	7	5	0	k	g	

Function	Description
LF	Line Feed ( 0A hex )
	Z = Centre of zero,
	O = Over cap,
S	U = Under cap,
	E = Weight not currently being displayed.
	" "(space) = None of the above conditions.
	Range.
R	1 = First range,
TX.	2 = Second range,
	3 = Third range.
	Mode.
	G = Gross weight,
N	T = Tare weight,
IV	N = Net weight,
	g = Gross weight in increased resolution.
	n = Net weight in increased resolution.
	Motion.
M	M = Motion,
	" "(space) = No motion.
F	Always a space as ASCII ( 20 hex ).
Indicated Weight	These ten characters are a string containing the current weight including the decimal point.
Unit	Unit of weight value are kg, g, lb, klb, N or kN as left aligned.
CR	Carrige Return ( 0D hex )

## **Sartorious**®

Descr	ription	Igno	ore			Sign	SP	Indica	ated	weigh	nt				SP	Unit		CR	LF
Exam	ple					+					0	7	5	0		k	g		

### Rinstrum®

Description	STX	Sign	Indicat	ed wei	ght					ST	ETX
Example	•				0	•	7	5	0	N	<b>~</b>

## Avery<sup>®</sup> E1205

Description	STX	Indicat	ed we	ight				SP	Unit		ST	CR	LF	ETX
Example	•			0	7	5	0		k	g	N			<b>\(\phi\)</b>

### **Baster**®

Description	Indicate	d Weight	:				LF
Example			0	7	5	0	

### LM2

Character number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	Indic	ated V	Veigh	t					Unit		SP	NET			LF	CR
Example-1				0	-	7	5	0	K	g		N	E	Т	LF	CR
Example-2				1	•	0	0	0	K	g	LF	CR				

Function	Description
Indicated Weight	These eight characters are a string containing the current weight not including the decimal point.
Unit	Unit of weight value are Kg, G, Lb, N or KN as left aligned.
SP	Only sent a space character in Net operation. Otherwise there is no any character.
NET	These three characters are only sent in Net operation. Otherwise there is no any character.
LF	Line Feed ( 0A hex )
CR	Carrige Return ( 0D hex )

## Tunaylar<sup>®</sup> Load Line-2

Description	STX	А	В	С	SP	Indic	ated	Wei	ght			SP	Tare	Wei	ght				ETX	СНК	CR
Example	•	!	1	0		0	0	2	4	6	0		0	0	0	0	0	0	<b>《</b>		

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## 11.6 ANALOGUE OUTPUT

**IMPORTANT NOTE:** The analogue output cable should be shielded. Connect the shield to the protective earth as described in the installation section.

PARAMETERS: Sub-block 19- for analogue output set up.

FT-111 has analogue output which is programmable to 4-20 mA, 0-20 mA, 0-5 V or 0-10 V. Analogue output is automatically adjusted to the weighing range after the calibration. The mid value of the analogue output is set to zero load at bipolar usage. The manual analogue output adjustment is available in parameter group 19-.

The analogue output is related with the gross or net load of the scale (default is gross). The analogue output signal operates as described below.

Under Zero	When the gross indication drops below zero, the analogue output reduces the analogue output to 0mA or - 4 V to indicate error on the analogue output.
Normal Range	The analogue output will reflect the gross value to the programmed analogue output $4-20\text{mA}$ , $0-20\text{mA}$ , $0-5\text{V}$ or $0-10\text{V}$ .
Over High Limit	When the gross value exceeds the high limit, the analogue signal increase to approximately 24 mA or 11 V and remains there until the weight display is no longer blanked or the analogue signal returns to within range.

The following table indicates the analogue output value when the gross indication is out of the range and if there is any error indication on the display.

Condition (On Display)	4-20 mA output	0-20 mA output	0 – 5 V output	0 – 10 V output
The weight is more than the range ( $\Gamma$ )	24 mA	24 mA	5.5 V	11 V
The weight is under the zero range $(L_{}J)$	0 mA	0 mA	-4.0 V	-4.0 V
Error [ Err XX ]	24 mA	24 mA	5.5 V	11 V
ADC is out of operating range ( LC Err )	24 mA	24 mA	5.5 V	11 V

The error data indicated above can be used to follow the errors at PLC.

## 11.6.1 Analogue Output Connection

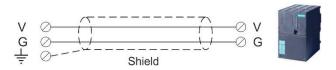


Figure 11.4 - Voltage output connections

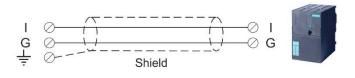


Figure 11.5 - Current output connection

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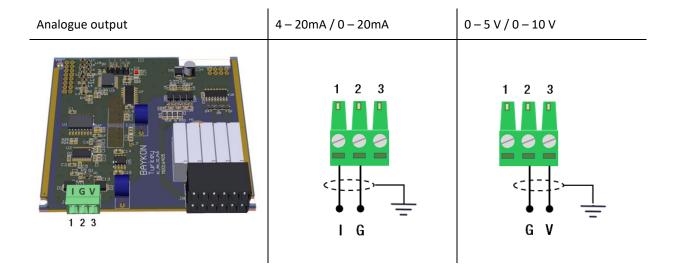


Figure 11.6 - Analogue output connection

Pin configuration of digital input and output connector is described on page 75.

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### 11.7 Modbus RTU

FT-111 controller has a Modbus RTU interface over RS485 / RS232C serial port. This interface can be programmed to High-Low or Low-High for different type of PLC's. You can find below the difference of these data formats and some companies using these formats. Two types are available as:

### 11.7.1 Modbus RTU Data Structure

After programming RS485 / RS232C serial port for Modbus RTU, it can be used as a Modbus RTU slave on Modbus RTU network. The Modbus slave address is defined in the RS-485 address (Page 47). Functions code '0x03' (Read Holding Registers), '0x06' (Single Write Register), '0x17' (Read/Write Multiple Registers) and '0x10' (Preset Multiple Registers) are supported.

**Modbus RTU High-Low:** In two-word registers, the data is stored to the registers in big-endian format. Least significant word is stored to the highest register address; and most significant word is stored to the lowest register address.

**Modbus RTU Low-High:** In two-word registers, the data is stored to the registers in little-endian format. Least significant word is stored to the lowest register address; and most significant word is stored to the highest register address.

### Parameter's set-up:

Set the RS 485 / RS 232C Data Format : Modbus RTU High-Low or Modbus RTU Low-High

RS-485 Data Length & Parity : 8 none 1, 8 odd 1 or 8 even 1

RS-485 Address : 01 to 31

Make the RS-485 / RS 232C parameter settings as defined on Page 45, 46, 47.

Please find Modbus information in the web site of <a href="http://www.modbus.org">http://www.modbus.org</a>

# Modbus RTU and TCP/IP Command Table:

Address	R/W	Word	Commar	ıd	Definition		
40001	R	2	Actual w	Actual weight (Net if the indication is in Net)			
40003	R/W	2	Tare wei	Tare weight			
40005	R	2	Gross we	Gross weight			
				Bit	Definition		
				B0-1	Not used		
				B2	0 – Weight is Stable	1 – Weight is unstable	
				В3	0 – Gross mode	1 – Net mode	
				B4	Not used	·	
				B5	0 – Not power on zeroed	1 – Zeroed with pwr on zero	
				B6	0 – First Unit (power on)	1 – Second Unit	
				B7-10	Not used	•	
40007	R	2	Status	B11	0 – Key lock is passive	1 – Key lock is active	
				B12	0 – Out of center of zero	1 – Weight is in center of zero	
				B13	0 – High res. is passive	1 – High res. is active	
				B14-B26	Not used		
				B27	0 – None	1 – Decimal point is X.XXXX	
				B28	0 – None	1 – Decimal point is X.XXX	
				B29	0 – None	1 – Decimal point is X.XX	
				B30	0 – None	1 – Decimal point is X.X	
				B31	0 – None	1 – No decimal point	
				Bit	Definition		
				B0	0 – No Error	1 – Low voltage det.	
				B1	0 – No Error	1 – In programming mode	
40009	R	2	Error	B2	0 – No Error	1 – System error	
40003	IX.	2	Status	B3	0 – No Error	1 – ADC under range	
				B4	0 – No Error	1 – ADC over range	
				B5	0 – No Error	1 – ADC out of range	
				B6	0 – No Error	1 – Tilt Switch is active	

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			B7 – E	331 Not	used				
40011	R	2	Heartbeat for co	nnection	checking, th	nis value is increased	l every 100 milliseconds.		
40013	R	2	Last print value						
40015	R/W	2	CN (Label numb	CN (Label number)		parameter [254] or	page 56.		
40017-24	R	8	Not used	Not used					
				Dec	Dec Definition				
				0	None				
				1	1 Zero				
				2	2 Tare				
				3	Clear				
				4	Print				
ı						ــا			
40025	R/W	2	Commands	5	Not use				
	,			6		solution enable			
				7	High res	solution disable			
				8	Unit cha	ange (from first to se	econd unit)		
				9	Unit cha	ange (from second to	o first unit)		
				10	Keylock	enable			
				11	Keylock	Keylock disable			
				28		Read stable weight and Record to Alibi			
				0	None				
40027	R	2	Commands	1	Comma	Command is processing			
40027	I'N	2	status	2		Command is successfully.  Command failed.			
40020	D // /	12	Netword	3	Comma	nd failed.			
40029	R/W	12	Not used		Bit	Definition			
		2			BO	Input-1			
40041	R		Status of Inputs		B1	Input-2	0 – Passive		
						Input-3	1 – Active		
	-				B3 B0	Input-4 Output-1			
					B0 B1	Output-1			
40043	R/W	2	Status of Output	ts	B2	Output-3	0 – Passive		
					В3	Output-4	1 – Active		
	- 6				B4	Output-5			
40045 40047	R/W R/W	2	Setpoint 1 Setpoint 2						
40047	R/W	2	Setpoint 2						
40051	R/W	2	Setpoint 4						
40053	R/W	2	Setpoint 5						
40057	R/W	30	Reserve						
40087	R	2	Alibi number						
40089	R	2	Net weight						
40091	R	2	Tare weight						
40093	R	2	Gross weight						
40127	R/W	2	Dynamic filter		Refer to	parameter [332] or	page 57		
			,		Dec	Description	. 5		
					0	No			
40129	R/W	2	Digital filter		1	Very Low			
					2	Low			
						3 Medium			

			1	1.	1
				4	High
				5	Very High
				0	Disable
				1	± 2%
40131	R/W	2	Power on zero	2	± 2%LK
40131	11,7 44		1 OWEI OII ZEIO	3	± %10
				4	+ %15, - %5
				5	± %20
				0	Disable
				1	± 2%
40133	R/W	2	Zeroing Range	2	± 3%
				3	± 20%
				4	± 50%
				0	Disable
				1	± 0,3d
				2	± 0,5d
40135	R/W	2	Auto Zero Tracking	3	± 1d
				4	± 2d
				5	± 3d
				0	No
40137	R/W	2	Tare	1	Multi tare
40137	11/ 00	2	Tale	2	Tare only at gross
				0	± 0,3d
		2	Stability Detection Range	1	± 0,5d
40420	D (14)			2	± 1d
40139	R/W			3	± 2d
				4	± 3d
				5	± 4d
				6	Disable
40141	R/W	2	Stability Time	Refer to p	parameter [517] on page 61
40143	R/W	10	Not used		
				Dec	Description
				0	g
				1	kg
40153	R/W	2	Unit	2	t
40153	R/W	2	Unit	3	lb
40153	R/W	2	Unit	3	lb oz
40153	R/W	2	Unit	3	Ib
40153	R/W	2	Unit	3	lb oz
40153	R/W	2	Unit	3 4 5	lb oz No
40153	R/W	2	Unit	3 4 5 0	lb oz No Single range
				3 4 5 0 1	Ib oz No Single range 2 x MR
				3 4 5 0 1 2	Ib oz No Single range 2 x MR 3 x MR
				3 4 5 0 1 2 3 4	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI
40155	R/W	2	Range	3 4 5 0 1 2 3 4	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI parameter [522] on page
40155	R/W	2	Range	3 4 5 0 1 2 3 4 Refer to p	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI parameter [522] on page Description
40155	R/W	2	Range	3 4 5 0 1 2 3 4 Refer to p	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI barameter [522] on page Description XXXXOO
40155 40157	R/W	2	Range MAX-1	3 4 5 0 1 2 3 4 Refer to p	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI parameter [522] on page Description XXXXOO XXXXXO
40155	R/W	2	Range	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI parameter [522] on page Description XXXXOO XXXXXXO XXXXXX
40155 40157	R/W	2	Range MAX-1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI  parameter [522] on page Description XXXXOO XXXXXXX XXXXXXX XXXXXXX
40155 40157	R/W	2	Range MAX-1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4	Ib OZ NO Single range 2 x MR 3 x MR 2 x MI 3 x MI Darameter [522] on page Description XXXXOO XXXXXXO XXXXXXX XXXXXXX XXXXXXX
40155 40157	R/W	2	Range MAX-1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5	Ib OZ NO Single range 2 x MR 3 x MR 2 x MI 3 x MI Darameter [522] on page Description XXXXOO XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157	R/W	2	Range MAX-1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI sarameter [522] on page Description XXXXOO XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157	R/W	2	Range MAX-1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec 0 0	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI sarameter [522] on page Description XXXXOO XXXXXO XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157 40159	R/W R/W	2 2 2	Range  MAX-1  Decimal point-1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ib OZ NO Single range 2 x MR 3 x MR 2 x MI 3 x MI Darameter [522] on page Description XXXXOO XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157 40159 40161	R/W R/W R/W	2 2 2	Range  MAX-1  Decimal point-1  Increment -1	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec 0 0	Ib oz No Single range 2 x MR 3 x MR 2 x MI 3 x MI sarameter [522] on page Description XXXXOO XXXXXO XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157 40159 40161 40163	R/W R/W R/W	2 2 2 2	Range  MAX-1  Decimal point-1  Increment -1  MAX -2	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ib OZ NO Single range 2 x MR 3 x MR 2 x MI 3 x MI Darameter [522] on page Description XXXXOO XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157 40159 40161 40163 40165	R/W R/W R/W R/W	2 2 2 2 2	Range  MAX-1  Decimal point-1  Increment -1  MAX -2  Decimal point-2	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ib OZ NO Single range 2 x MR 3 x MR 2 x MI 3 x MI Darameter [522] on page Description XXXXOO XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
40155 40157 40159 40161 40163	R/W R/W R/W	2 2 2 2	Range  MAX-1  Decimal point-1  Increment -1  MAX -2	3 4 5 0 1 2 3 4 Refer to p Dec 0 1 2 3 4 5 Dec 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ib OZ NO Single range 2 x MR 3 x MR 2 x MI 3 x MI Darameter [522] on page Description XXXXOO XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX

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40169	R/W	2	MAX -3					
40171	R/W	2	Decimal poin	it-3				
40173	R/W	2	Increment -3					
					Dec		Description	
					0		Over indication after Max.	
40175 R/W		2	Limit of Indic	ation	1		1 division more than Max.	
40173	11,700	-	Elittie of male	acion	2		9 divisions more than Max. 2% more than Max.	
					3			
					4		5% more than Max.	
40177	R/W	8	Not used	T_	- c			
				Dec	Defin			
				0	None			
40405	5 /11/		Calibration	188			Calibration command	
40185	R/W	2	Commands	220	-	-	n Calibration command	
							test weight value to 40187)	
				23205	1		coefficients of eCal	
					(first,	load	40189, 40191 and 40193)	
40187	R/W	2	Span Calibra	tion Value				
40189	R/W	2	Total Load Co	ell capacity for e	eCal			
40191	R/W	2	Average mV/	V value for eCa	l			eCal
40193	R/W	2	Dead load va					Coefficients
40133	11,7 00		Dead load va	T Car				
					Bit	Defi	inition	
					В0	Rea	dy for calibration	
					B1 Zero calibration in process B2 Span calibration in process Calibration Timeout		calibration in process	
							n calibration in process	
							bration Timeout	
					В3	- Re	start calibration	
						ADC	Error	
					B4		-energize the instrument	
						- If s	seen again, change the board.	
						Inst	rument cannot be calibrating	
					B5		eck load cell cable	
						- Re	-energize the instrument	
			Calibration			l		
40195	R	2	Process		В6		rument cannot be calibrating	a biab
40133	1	-	Status			- LO	ad cell signal is very low or too	nign
			& Errors			Calil	bration Error	
					В7	- Ca	libration loading is not enougl	h
					Б/		eck test weight loading	
						- Ch	eck load cell connections	
						Calil	bration load value entry Error	
					B8		st weight is too small. Increase	
							e unstable	
					В9		ait until scale become stable	
						- Ch	eck grounding wiring	
								o
					B10		Calibration DIP switch is not '	•
						- Ch	eck the calibration DIP switch	•
40197	R/W	10	Not used	1	1	I		
	,		Voltage of		They	alue i	s indicated with 0.1 VDC incre	ment for DC
40207	R	2	Power supply	<i>y</i>	The value is indicated with 0.1 VDC increment for Do variant or 1 VAC increment for AC variant.			
			. Swel supply	1	variant of 1 vac increment for AC variant.		··	

40209	R	2	Load cell millivolt value (only FT-111)	Millivolt value of active scale is indicated with 0.01 mV increment. For example: 2.34 mV is indicated as integer 234 value.
40211	R/W	2	Load parameter's defaults	Write 0x6BB6 value to load parameter's defaults <sup>(1)</sup>
40213	R/W	2	Load factory defaults	Write 0x7CC7 value to load factory defaults <sup>(1)</sup>

<sup>(1)</sup> Reconnect the host after loading this command.

### Programming steps of frequent used commands:

### Reading a weight value:

- 1. Read 40009 and 40010.
- 2. Check error status,
- 3. If there isn't any error, read the weight value (gross, net or tare),
- 4. If there is an error, check the error code.

### Zero Calibration procedure:

- 1. Check the bit B0 of 40195 which should be '1' to start adjustment.
- 2. Load the decimal '188' to 40185 to start Zero calibration.
- 3. Check the bit B1 of 40195 which is '1' during zero calibration process.
- 4. The bit B0 of 40195 changes to '1' at the end of the Zero calibration.
- 5. If one of error bits (B3 ~ B10) of 40195 is '1', check error code to understand the calibration error.

### Span Calibration procedure:

- 1. Check the bit B0 of 40195. it should be '1' to start adjustment.
- 2. First load the span value to 40187-188 and then load the decimal '220' to 40185 to start Span calibration.
- 3. Check the bit B2 of 40195 which is '1' during span calibration process.
- 4. The bit B0 of 40195 changes to '1' at the end of the Span calibration.
- 5. If one of error bits (B3 ~ B10) of 40195 is '1', check error code to understand the calibration error.

### **EXPLANATION:**

**Attention:** For hardware connection details, please refer to the related hardware descriptions in this manual. **Exception codes:** 

- 1: Function code is not supported.
- 2: Out of beginning and ending address range.
- 3: Invalid value entrance or wrong byte number.
- 4: Operation error.

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## **Command Examples:**

Performing Read and Write operations according (Modbus RTU High-Low) to hex system with the instrument set to address "0x01".

Below you will find some command samples;

Description	Hex
Request weight data	01,03,00,00,00,02,C4,0B
Answer of request weight	01,03,04,00,01,86,A0,38,4A
(weight value is 100000)	
Request status data	01,03,00,07,00,02,75,CA
Taring	01,10,00,18,00,02,04,00,00,00,02,72,C4
Request tare data	01,03,00,02,00,02,65,CB
Answer of request tare	01,03,04,00,00,27,10,E0,0F
(tare value is 10000)	
Zero Command	01,10,00,18,00,02,04,00,00,00,01,32,C5
Request Calibration Status	01,03,00,C2,00,02,65,F7
Answer of request Calibration Status	01,03,04,00,00,01,3B,F3
(Instrument is ready for calibration)	
Zero Calibration	01,10,00,B8,00,02,04,00,00,00,BC,F8,CC
Span Calibration Command with Span	01,10,00,B8,00,04,08,00,00,00,DC,00,00,C3,50,94,84
value 50000	
Total LC capacity Command with Total LC	01,10,00,B8,00,06,0C,00,00,00,EC,00,00,00,00,00,01,86,A0,D7,B9
capacity value 100000	
Average mV/V Command with Average	01,10,00,B8,00,08,10,00,00,00,FA,00,00,00,00,00,00,00,00,00,00,4E
mV/V value 1.9999	,1F,8E,3D
Dead load Command with Dead load value	01,10,00,B8,00,0A,14,00,00,00,AB,00,00,00,00,00,00,00,00,00,00
12345	,00,00,00,30,39,7F,06
Save the coefficients of eCal Command	01,10,00,B8,00,02,04,00,00,5A,A5,03,A6
Read digital inputs	01,03,00,28,00,02,44,03
Answer of digital inputs	01,03,04,00,00,00,02,7B,F2
(Input-2 is active)	
Read digital outputs	01,03,00,2A,00,02,E5,C3
Answer of digital outputs	01,03,04,00,00,00,04,FB,F0
(Output-3 is Active)	
Read Set point-1	01,03,00,2C,00,02,05,C2
Answer of Set point-1	01,03,04,00,00,03,E8,FA,8D
Load Set point 1 = 5000	01,10,00,2C,00,02,04,00,00,13,88,FC,B4

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# 11.8 ETHERNET TCP/IP

Ethernet output of FT-111 is programmable to BSI command set, Continuous data output, Fast continuous data output, Modbus TCP/IP High-Low, Modbus TCP/IP Low-High. The first three data structures can be find in the related sections indicated in the table below.

Data Format	Description	
BSI Command set	Refer to <i>Page 76.</i>	
Continuous	Refer to <i>Page 38, 87</i> .	
Fast Continuous	Refer to <i>Page 39.</i>	
Modbus TCP High-Low	Modbus TCP interfacing. Refer to <i>Page 99</i> .	
Modbus TCP Low-High	Modbus TCP interfacing. Refer to <i>Page 99</i> .	

Table 11-1 - Ethernet output interfacing

You can communicate with FT-111 after programming Ethernet TCP/IP and Modbus TCP related parameters [15-].

### 11.8.1 Ethernet Parameters

Ethernet parameters can be adjusted by keys in programming mode. Refer to parameter block [15-]. Additionally, Ethernet parameters set up is done by EtherX PC software over Local Network Area or by IndFace2x. The software are available on <a href="https://www.flintec.com">www.flintec.com</a>

Parameters	Descriptions
Host Name	Device name of the instrument. Refer to parameter 255.
IP Address	Obtain IP address manually. Refer to parameter 152.
Local Port	Ethernet connection port of the instrument. Refer to parameter 156.
Gateway	Network point that acts as an entrance to another network.  Refer to parameter 155.
Subnet Mask	Describes IP address can be used in network. Refer to parameter 154.
Primary DNS	Obtain primary DNS manually. Refer to parameter 159.
Secondary DNS	Obtain secondary DNS manually.
Remote Connection Check Box	Automatic connection to any device on the network. Refer to parameter 15E and 15F. Default is 'Disabled'.
Remote IP Address	IP address of the PC, Printer or Device to be connected automatically. Enter IP address of the remote device.
Remote Port	Ethernet connection point of PC, Printer or Device to be connected automatically. Enter port number of the remote device.
Password	Default password is 123456.
Set Defaults	Sets factory defaults.

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### 11.8.2 Modbus TCP Data Structure

If the instrument is programmed for Modbus TCP/IP, it can be used as a Modbus TCP/IP slave on Ethernet communication network. Functions code '0x03' (Read Holding Registers), '0x06' (Single Write Register), '0x17' (Read/Write Multiple Registers) and '0x10' (Preset Multiple Registers) are supported.

**Modbus TCP/IP High-Low:** In two-word registers, the data is stored to the registers in big-endian format. Least significant word is stored to the highest register address; and most significant word is stored to the lowest register address.

**Modbus TCP/IP Low-High:** In two-word registers, the data is stored to the registers in little-endian format. Least significant word is stored to the lowest register address; and most significant word is stored to the highest register address.

### Parameter's set-up

Set Ethernet Data Format: Modbus TCP/IP High-Low or Modbus TCP/IP Low-High

Ethernet Address : 01 to 255

Make the Ethernet parameter settings as defined on sub-block 15-

Please find Modbus information in the web site of http://www.modbus.org

### For Modbus TCP/IP Command Table see page 92

For command samples see page 97:

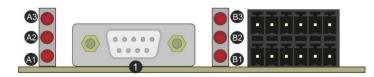
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## 11.9 PROFIBUS DP

In Profibus DPV1 interface, baud rate is detected automatically. Supported baud rates are 9.6 kbps, 19.2 kbps, 45.45 kbps, 93.75 kbps, 187.5 kbps, 500 kbps, 1.5 Mbps, 3 Mbps, 6 Mbps and 12 Mbps. No 'baud rate' instance exists. Refer to Profibus parameters, sub-block 19-,

 $\textbf{GSD file} \text{ is available on } \underline{www.flintec.com} \;.$ 

There are LEDs near the Profibus connector which are:



Ref.	Definition	Ref.	Definition	Ref.	Definition
А3	Operation Error LED	В3	Module Error LED		
A2	Not used	B2	Not used		
A1	Operation mode LED	B1	Module Status LED	1	Profibus port

### A1 Operation mode LED

State	Indication	Comment
Off	Not online /No power	Check power and cable
On	On-line, data exchange	-
Flashing	On-line, clear	-

### A3 Operation Error LED

State	Indication	Comment
Off	No error	
Flashing (2 flash)	PROFIBUS configuration error	Check GSD file configuration.

### **B1** Module Status LED

State	Indication	Comment
Off	Not power or not initialized	No power or Profibus module is in initialization state
On	Initialized	
Flashing	Initialized, diagnostic event(s) present	Diagnostic is active

### **B3** Module Error LED

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State	Indication	Comment
Off	No error	
On	Exception error	There is an exception error

## 11.9.1 Electrical Connection



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### **PROFIBUS Connector pin configuration (DB9F)**

Pin	Signal	Description
1	-	-
2	-	-
3	B Line	Positive RxD / TxD, RS-485 level
4	RTS	Request to send
5	GND Bus	Ground (isolated)
6	+5V Bus Output	+5V termination power (isolated)
7	-	-
8	A Line	Negative RxD / TxD, RS-485 level
9	-	-
Housing	Cable Shield	Ground

Pin configuration of digital input and output connector is described on page 75.

### 11.9.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

## 11.9.3 GSD Configuration

Profibus data consist of 2 pcs Input-2 words and 2 pcs Output-2 words. GSD configuration for PLC programmers is shown in Figure 11.8.

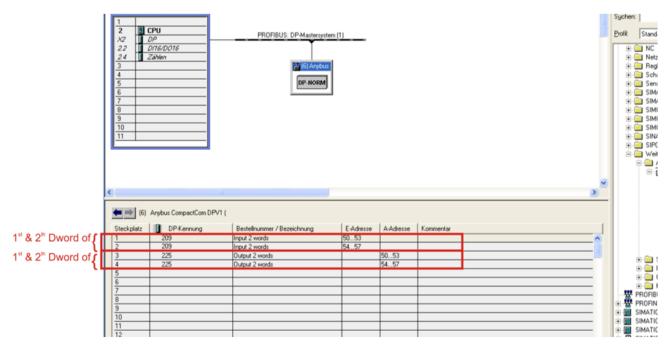


Figure 11.8 - GSD Configuration

GSD Configuration	Description
Input 2 words	1 <sup>st</sup> Dword (FT-111 Output to PLC Input)
Input 2 words	2 <sup>nd</sup> Dword (FT-111 Output to PLC Input)
Output 2 words	1 <sup>st</sup> Dword (PLC Output to FT-111 Input)
Output 2 words	2 <sup>nd</sup> Dword (PLC Output to FT-111 Input)

### 11.9.4 Profibus DP Data Structure

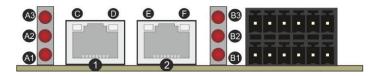
For the Data Structure for Profibus see Appendix 1, page 117

## 11.10PROFINET

Profinet interface of the weighing instrument can be done via hub switch or serial bus over two Profinet port.

- 1. Serial bus connection of instruments. You may connect instruments serial to your Profinet bus via two ports.
- 2. Star connection. If you connect the instrument to your PLC via hub switch, you can use P1 or P2 port on the instrument. You may change the port if there is any malfunction on port in usage.

The Profinet interface is 100Mbit and full duplex. **GSDML file** for two port Profinet is on <u>www.flintec.com</u> There are a few announcement LEDs on the instrument to indicate the interface status as seen below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
А3	Not used	В3	Module Error LED	1,2	Interface ports ( P1,P2 )
A2	Not used	B2	Not used	D,F	Not used
A1	Network Status LED	B1	Module Status LED	C,E	Link/Activity LEDs

### A1 Network Status LED

LED State	Description	Comment
Off	Not online /No power	Check power and cable
On	On-line RUN	-
Flashing	On-line STOP	-

### **B1** Module Status LED

LED State	Description	Comment
Off Not power or not initialized		No power or Profinet module is in initialization state
On	Normal operation	
1 flash	Initialized, diagnostic event(s) present	Diagnostic is active

## **B3** Module Error LED

LED State	Description	Comment
Off	No Error	
On	Exception error	There is an exception error
1 flash	Configuration Error	Check GSDML configuration
2 flashes	IP Address Error	IP address not set
3 flashes	Device Name Error	Device name not set
4 flashes	Internal Module Error	Re-energize the instrument. If seen again, change the board.

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

# C, E LINK/Activity LED

LED State	Description	Comment
Off	No Link	No link, no communication present
On	Link	Ethernet link established, no communication present
Flickering	Activity	Ethernet link established, communication present

## 11.10.1 Electrical Connection



Figure 11.9 - PLC Connection

### **PROFINET Connector pin configuration (RJ45)**

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data –
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data –
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

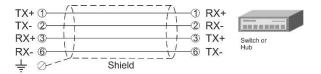


Figure 11.10 - HUB connection

The PC connection cabling will be done via cross cable as shown below. IP address blocks and gateway address of weighing terminal and PC should be the same in cross connection.

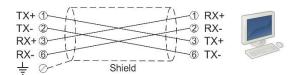


Figure 11.11 - Cross PC connection

Pin configuration of digital input and output connector is described on page 75.

## 11.10.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191].

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### 11.10.3 Profinet Parameters

Profinet parameters can be adjusted by keys in programming mode. Refer to parameter block [ 19- ]. Additionally, Profinet parameters set up is done by EtherX PC software over Local Network Area or by IndFace2x. Both software are available on <a href="https://www.flintec.com">www.flintec.com</a>.

Note: Station name is 'scale-1' as a default. Refer to parameter 196.

Parameters	Descriptions
DHCP	Dynamic Host Configuration Protocol automates network parameters if it is enabled.
Heat Name	Device name of the instrument.
Host Name	Refer to parameter 196.
	If DHCP is disabled, obtain IP address manually.
IP Address	Refer to parameter 192.
	If DHCP is disabled, obtain default gateway manually.
Gateway	Refer to parameter 195.
	If DHCP is disabled, obtain subnet mask manually.
Subnet Mask	Refer to parameter 194.
	If DHCP is disabled, obtain primary DNS manually.
Primary DNS	Refer to parameter 199.
Secondary DNS	If DHCP is disabled, obtain secondary DNS manually.
Password	Default password is 123456.

## 11.10.4 GSDML Configuration

Profinet data consist of 2 pcs Input-2 words and 2 pcs Output-2 words. GSDML configuration for PLC programmers is shown in Figure 11.13.

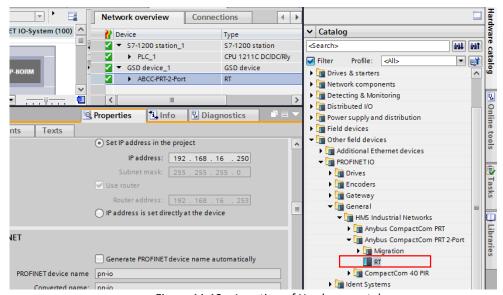


Figure 11.12 – Location of Hardware catalog

RT Use with newer PLC hardware such as S7-1200 and S7-1500.
RT Migration Use with older PLC hardware such as S7-300.

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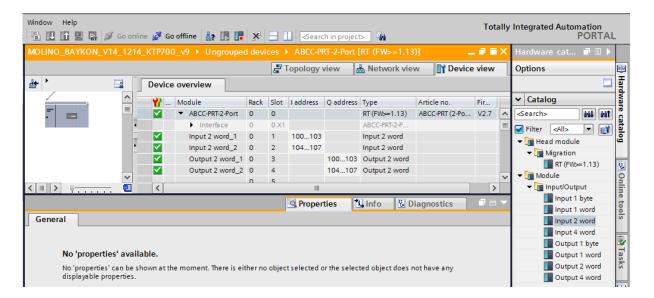


Figure 11.13 - GSDML Configuration

<b>GSDML Configuration</b>	Description
Input 2 word_1	1 <sup>st</sup> Dword (FT-111 Output to PLC Input)
Input 2 word_2	2 <sup>nd</sup> Dword (FT-111 Output to PLC Input)
Output 2 word_1	1 <sup>st</sup> Dword (PLC Output to FT-111 Input)
Output 2 word_2	2 <sup>nd</sup> Dword (PLC Output to FT-111 Input)

### 11.10.5 Profinet Data Structure

For the Data Structure see Appendix 1, page 117

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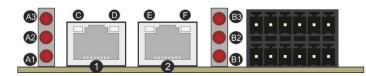
# 11.11 ETHERNET/IP

EtherNet/IP interface of the weighing instrument can be done via hub switch or serial bus over two EtherNet/IP port.

- 1. Serial bus connection of instruments. You may connect instruments serial to your EtherNet/IP bus via two ports.
- 2. Star connection. If you connect the instrument to your PLC via hub switch, you can use P1 or P2 port on the instrument. You may change the port if there is any malfunction on port in usage.

The EtherNet/IP interface supports 10/100Mbit, full or half duplex operation. **EDS file** for two port EtherNet/IP is available on <a href="https://www.flintec.com">www.flintec.com</a>

There are announcement LEDs on the instrument to indicate the interface status as seen below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
А3	Network Error LED	В3	Module Error LED	1,2	Interface ports ( P1,P2 )
A2	Not used	B2	Not used	E,F	Link/Activity LEDs for P2
A1	Network Status LED	B1	Module Status LED	C,D	Link/Activity LEDs for P1

### A1 Network Status LED

LED State	Description
Off	No IP address
On	Online, one or more connections established (CIP Class 1 or 3)
Flashing	Online, no connections established

### A3 Network Error LED

LED State	Description
Off	No error
On	Duplicate IP address, FATAL error
Flashing	One or more connections timed out (CIP Class 1 or 3)

### **B1** Module Status LED

LED State	Description
Off	No power
On	Controlled by a scanner in run state
Flashing	Not configured, or scanner in idle state

## **B3** Module Error LED

LED State	Description
Off	No Error
On	Major fault (EXCEPTION state, FATAL error etc.)
Flashing	Recoverable fault(s)

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

### C,D, E, F LINK/Activity LED

LED State	Description
Off	No link, no activity
Green	Link (100 Mbit/s) established
Green, flickering	Activity (100 Mbit/s)
Yellow	Link (10 Mbit/s) established
Yellow, flickering	Activity (10 Mbit/s)

## 11.11.1 Electrical Connection



Figure 11.14 - PLC Connection

## EtherNet/IP Connector pin configuration (RJ45)

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data –
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data –
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

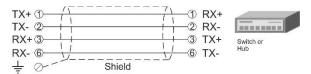


Figure 11.15 - HUB connection

The PC connection cabling will be done via cross cable as shown below. IP address blocks and gateway address of weighing terminal and PC should be the same in cross connection.

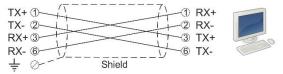


Figure 11.16 - Cross PC connection

Pin configuration of digital input and output connector is described on page 75.

## 11.11.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

## 11.11.3 EtherNet/IP Parameters

EtherNet/IP parameters can be adjusted by keys in programming mode. Refer to parameter block [ 19- ]. Additionally, EtherNet/IP parameters set up are done by EtherX PC software over Local Network Area or by IndFace2x. Both softwares on <a href="https://www.flintec.com">www.flintec.com</a>

Parameters	Descriptions		
Host Name	Device name of the instrument.		
DHCP	Dynamic Host Configuration Protocol automates network parameters if it is enabled.		
	If DHCP is disabled, obtain IP address manually.		
IP Address	Refer to parameter 192.		
	If DHCP is disabled, obtain default gateway manually.		
Gateway	Refer to parameter 195.		
	If DHCP is disabled, obtain subnet mask manually.		
Subnet Mask	Refer to parameter 194.		
Primary DNS	If DHCP is disabled, obtain primary DNS manually.		
Secondary DNS	If DHCP is disabled, obtain secondary DNS manually.		
Password	Default password is 123456.		

## 11.11.4 EDS Configuration

EtherNet/IP data structures consist of 2 pcs Input-2 words and 2 pcs Output-2 words. EDS configuration for PLC programmers is shown in Figure 11.17 and Figure 11.18.

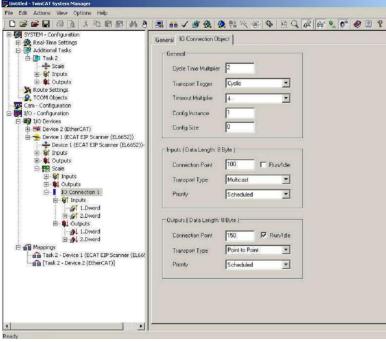


Figure 11.17 - Configuration of module properties without EDS file

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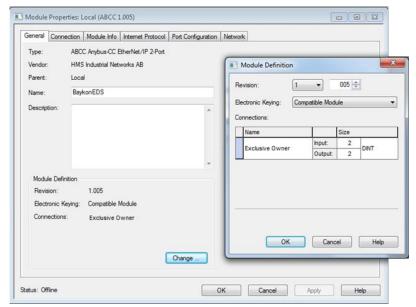


Figure 11.18 – Configuration of module properties with EDS file

Data Length	Description
Input 2 words	1st Dword (FT-111 Output to PLC Input )
Input 2 words	2nd Dword (FT-111 Output to PLC Input )
Output 2 words	1st Dword (PLC Output to FT-111 Input )
Output 2 words	2nd Dword ( PLC Output to FT-111 Input )

# 11.11.5 EtherNet/IP Data Structure

For the Data Structure see Appendix 1, page 117

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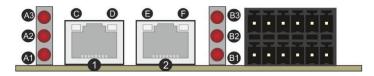
## 11.12ETHERCAT

EtherCAT interface of the weighing instrument can be done via hub switch or serial bus over two EtherCAT port.

- 1. Serial bus connection of instruments. You may connect instruments serial to your EtherCAT bus via two ports.
- 2. Star connection. If you connect the instrument to your PLC via hub switch, you can use P1 port on the instrument.

The EtherCAT interface supports 100Mbit, full duplex operation. **ESI file** for two port EtherCAT is available on www.flintec.com .

There are announcement LEDs on the instrument to indicate the interface status as seen below. The meanings of these LED's are



Ref.	Definition	Ref.	Definition	Ref.	Definition
А3	Network Error LED	В3	Not used	1,2	Interface ports (IN, OUT
A2	Not used	B2	Not used	D, F	Not used
A1	Network Status LED	B1	Module Status LED	C, E	Link/Activity LEDs

#### A1 Network Status LED

LED State	Description
Off	INIT
On	OPERATIONAL
Blinking	PRE-OPERATIONAL
Single flash	SAFE-OPERATIONAL

#### A3 Network Error LED

LED State	Description
Off	No error
On	(Fatal Event)

#### **B1** Module Status LED

LED State	Description
Off	No any error (or no power)
Blinking	Invalid configuration: State change received from master is not possible due to invalid register or object settings.
Single flash	Unsolicited state change: Slave device application has changed the EtherCAT state autonomously.
Double flash	Application watchdog timeout
On	Application controller failure

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

#### C, E LINK/Activity LED

LED State	Description
Off	No link, no activity.
Green	Link sensed, no activity.
Green, flickering	Link sensed; activity exist.

#### 11.12.1 Electrical Connection



#### **EtherCAT**



Figure 11.19 - PLC Connection

## **EtherCAT Connector pin configuration (RJ45)**

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data –
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data –
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown:

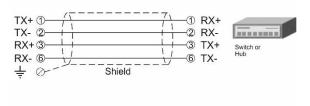


Figure 11.20 - HUB connection

Pin configuration of digital input and output connector is described on page 75.

## 11.12.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

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## 11.12.3 ESI Configuration

EtherCAT data structures consist of 2 pcs Input-2 words and 2 pcs Output-2 words. ESI configuration for PLC programmers is shown in Figure 11.21.

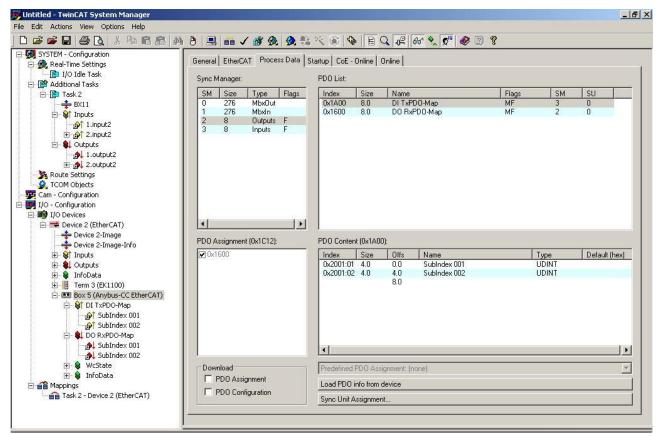


Figure 11.21 - Configuration of module properties for Beckhoff

Input/Output	Definition	Description
DI TxPDO-Map	SubIndex 001	1 <sup>st</sup> Dword ( FT-111 Output to PLC Input )
	SubIndex 002	2 <sup>nd</sup> Dword ( <i>FT-111 Output to PLC Input</i> )
DO RxPDO-Map	SubIndex 001	1 <sup>st</sup> Dword ( <i>PLC Output to FT-111 Input</i> )
	SubIndex 002	2 <sup>nd</sup> Dword ( <i>PLC Output to FT-111 Input</i> )

#### 11.12.4 EtherCAT Data Structure

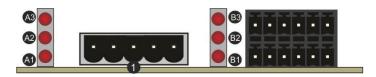
For the Data Structure see Appendix 1, page 117

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## 11.13CC-LINK

After setting related parameters you can communicate with FT-111 via CC-Link network. Supported CC-Link version is v1.10 and baud rates are 156 kbps (default), 625 kbps, 2,5 Mbps, 5 Mbps and 10 Mbps.

There are LEDs near the CC-Link connector which are:



Ref.	Definition	Ref.	Definition	Ref.	Definition
А3	Operation Error LED	В3	Not used		
A2	Not used	B2	Not used		
A1	Operation mode LED	B1	Module Error LED	1	CC-Link port

## A1 Operation mode LED

LED State	Description
Off	No network participation, timeout status (no power)
On	Participating, normal operation

#### A3 Operation Error LED

LED State	Description
Off	No error
On	Major fault (FATAL error)

#### **B1** Module Error LED

LED State	Description
Off	No error detected (no power)
On	Major fault (Exception or FATAL event)
Flickering	CRC error (temporary flickering)
Flashing	Station Number or Baud rate has changed since startup (flashing)

In the case of red LED warning, check cabling, configuration, and station number. Power off the instrument and reenergize the instrument 30 seconds later.

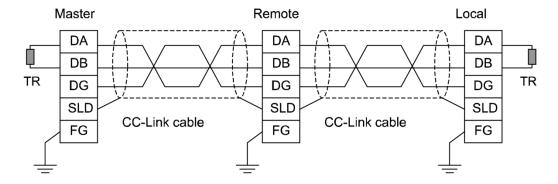
## 11.13.1 Electrical Connection



Figure 11.22 - PLC Connection

## **CC-Link Connector pin configuration**

Pin	Signal	Description
1	DA	PositiveRS485 Rxd/TxD
2	DB	NegativeRS485 Rxd/TxD
3	DG	Signal ground
4	SLD	Cable Shield
5	FG	Protective Earth



Pin configuration of digital input and output connector is described in Appendix 3, page 75.

#### 11.13.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

# 11.13.3 CC-Link Configuration

Weighing terminal has occupied one station area on CC-Link network and station type of weighing terminal must be programmed as 'Remote device station' in the PLC software. CC-Link configuration for PLC programmers is shown in Figure 11.23.

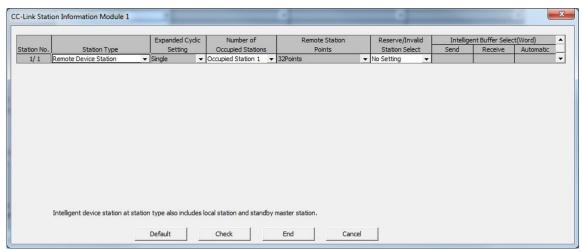


Figure 11.23 - Station information

Input/Output	Definition	Description
D ( D ( (D))	RWr0, RWr1	1 <sup>st</sup> Dword Input ( <i>FT-111 Output to PLC Input</i> )
Remote Register (RWr)	RWr2, RWr3	2 <sup>nd</sup> Dword Input ( <i>FT-111 Output to PLC Input</i> )
Remote Input (RX)	RX0 ~ RX31	Not used
Domete Degister (DM/m)	RWw0, RWw1	1 <sup>st</sup> Dword Output ( <i>PLC Output to FT-111 Input</i> )
Remote Register (RWw)	RWw2, RWw3	2 <sup>nd</sup> Dword Output ( <i>PLC Output to FT-111 Input</i> )
Remote Output (RY)	RY0 ~ RY31	Not used

#### 11.13.4 CC-Link Data Structure

For the Data Structure see Appendix 1, page 117

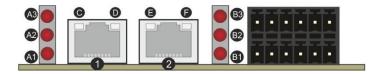
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## 11.14Powerlink

Powerlink interface of the weighing instrument can be done via hub switch or serial bus over two Powerlink port.

- 1. Serial bus connection of instruments. You may connect instruments serial to your Powerlink bus via two ports.
- 2. Star connection. If you connect the instrument to your PLC via hub switch, you can use P1 or P2 port on the instrument. You may change the port if there is any malfunction on port in usage.

The Powerlink interface is 100Mbit and half duplex. **XDD file** for two port Powerlink is available on <a href="www.flintec.com">www.flintec.com</a> There are announcement LEDs on the instrument to indicate the interface status as seen below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Network Error LED	В3	Not used	1,2	Interface ports (IN, OUT)
A2	Not used	B2	Not used	D,F	Not used
A1	Network Status LED	B1	Module Error LED	C,E	Link/Activity LEDs

#### A1 Network Status LED

LED State	Description
Off	Module is off, initializing, or not active.
Fast flashing <sup>a</sup>	NMT_CS_BASIC_ETHERNET  Basic Ethernet state: no POWERLINK traffic has been detected.
Single flash	NMT_CS_PRE_OPERATIONAL_1. Only asynchronous data.
Double flash	NMT_CS_PRE_OPERATIONAL_2. Asynchronous and synchronous data. No PDO data. <sup>b</sup>
Triple flash	NMT_CS_READY_TO_OPERATE.  Ready to operate. Asynchronous and synchronous data. No PDO data. <sup>b</sup>
On	NMT_CS_OPERATIONAL. Fully operational. Asynchronous and synchronous data. PDO data is sent and received.
Slow flashing <sup>c</sup>	NMT_CS_STOPPED  Module stopped (for controlled shutdown, for example). Asynchronous and synchronous data. No PDO data. <sup>b</sup>

- a. On 50 ms, off 50 ms.
- b. Any process data sent is declared not valid and received process data must be ignored in this state.
- c. On 200 ms, off 200 ms.

#### A3 Network Error LED

LED State	Description
Off	No error
On	If the MODULE ERROR LED also is On, a fatal event was encountered.

#### **B1** Module Error LED

LED State	Description
Off	No error
On	If the NETWORK ERROR LED is Off, a non-fatal error has been detected.
Oli	If the NETWORK ERROR LED is On, a fatal event was encountered.

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

#### C, E LINK/Activity LED

LED State	Description
Off	No link.
Green	Link, no traffic.
Green, flashing	Link and traffic.

## 11.14.1 Electrical Connection



Figure 11.24 - PLC Connection

## **Powerlink Connector pin configuration (RJ45)**

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data –
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data –
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

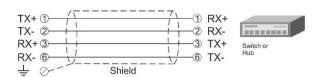


Figure 11.25 - HUB connection

Pin configuration of digital input and output connector is described on page 75.

## 11.14.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

## 11.14.3 XDD Configuration

Powerlink data structures consist of 2 pcs Input-2 words and 2 pcs Output-2 words. XDD configuration for PLC programmers is shown in Figure 11.26.

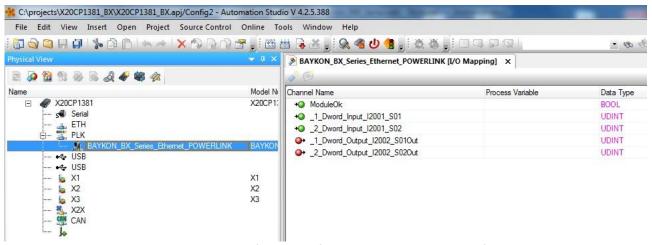


Figure 11.26 – Configuration of module properties with XDD file

Data Length	Description
1_Dword_Input_I2001_S01	1 <sup>st</sup> Dword (FT-111 Output to PLC Input )
2_Dword_Input_I2001_S02	2 <sup>nd</sup> Dword (FT-111 Output to PLC Input )
1_Dword_Output_I2002_S01Out	1 <sup>st</sup> Dword ( PLC Output to FT-111 Input )
2_Dword_Output_I2002_S02Out	2 <sup>nd</sup> Dword ( PLC Output to FT-111 Input )

## 11.14.4 Powerlink Data Structure

For the Data Structure see Appendix 1, page 117

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# 12 APPENDIX 1 – DATA STRUCTURE PROFIBUS, PROFINET, ETHERNET/IP, ETHERCAT, CC-LINK, POWERLINK

The write and read table are similarly structured and bitwise of a Dword descripted below

Dword	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
(Only read)	B15	B14	B13	B12	B11	B10	В9	B8	В7	В6	B5	B4	В3	B2	B1	В0

Table 12-1- Bitwise of a Dword

## **FT-111 Output to PLC Input**

1st Dword (INPUT)	By default, Actual weight value is represented. To represent other weight or calibration status, refer to next Dword.													
2nd			Out 5	Out 4	Out 3	Out 2	Out 1				In 4	In 3	In 2	In 1
Dword (INPUT)	Error codes FT-111			Unit			Centre of zero		SD	Read command response			Cmd Flg	

Description of Input 2<sup>nd</sup> Dword (INPUT)

Bit Number	Description	Description									
B31 B24	Digital Outputs	Output	Output bit status (Active = 1)								
B23 B16	Digital Inputs	Input bit	Input bit status (Active = 1)								
		Bin	Dec	Descriptions							
		0000	0	No error found							
		0001	1	ADC out							
	Funer Codes	0010	2	ADC over							
B15 B12	Error Codes of FT-111	0011	3	ADC under							
	01 F1-111	0100	4	System Error							
		0101	5	In programming mode							
l		0110	6	Low/High Voltage Error							
		0111	7	Tilt Switch is active							
B11	Unit	0		First unit							
	Offic	1		Second unit							
B10-B9	Not used										
B8	Centre of zero	0		Weight is out of zero range							
Вб	Centre of Zero	1		Weight is in zero range							
В7	Indication	0		Gross							
D/	mulcation	1		Net							
В6	Stability	0		Stable							
ВО	Detection	1		Unstable							
		Bin	Dec	Descriptions							
		00000	0	Actual weight (Net if the indication is in Net)							
		00001	1	Gross weight							
		00010	2	Tare weight							
		00011	3	ALL Status ( Refer to Table 12-2 )							
	Read Command	00100	4	Calibration Status ( Refer to <i>Table 12-3</i> )							
B5 B1	Response	00101	5	Last print value							
20 52		00110	6	Not used							
		01010	10								
		01011	11	CN (Label number)							
		01100 01110	12 14	Not used							
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		01111	15	Set Point-1
		10000	16	Set Point-2
		10001	17	Set Point-3
		10010	18	Set Point-4
		10011	19	Set Point-5
		10100	20	Not used
		11110	30	Not used
		11111	31	Expanded Commands List (Refer to Table 12-4)
В0	CMD Flag	Toggles		The command is applied successfully

## ALL Status (always 32 bit integer)

1<sup>st</sup> Dword (input) descriptions when read command is 'ALL Status'. *Refer to 2<sup>nd</sup> Dword of PLC Output to FT-111 Input.* 

Bit Number	1st Dword (input) Descri	ption	
D24		0	None
B31		1	No decimal point
B30	Place of decimal point	0	None
B30		1	Decimal point is X.X
B29		0	None
B23	Place of decimal point	1	Decimal point is X.XX
B28		0	None
D28		1	Decimal point is X.XXX
B27		0	None
D27		1	Decimal point is X.XXXX
B26 B14	Not in use		
D42	Ulah masalmkian akakus	0	Passive
B13	High resolution status	1	Active
B12	Centre of zero	0	Weight is out of zero range
DIZ	Centre of zero	1	Weight is in zero range
B11	Key lock status	0	Passive
DII	Key lock status	1	Active
B10B7	Not in use		
D.C.	their in disertion	0	First Unit (power on unit)
B6	Unit indication	1	Second Unit
B5	Power On Zero	0	Not power on zeroed
БЭ	Power On Zero	1	Zeroed with power on zero
B4	Not in use		
D2	Indication	0	Gross mode
B3	Indication	1	Net mode
D2	Mation Detection	0	Stable
B2	Motion Detection	1	Unstable
B1B0	Not in use		

Table 12-2 - ALL Status table

## Calibration Status (always 32 bit integer)

1<sup>st</sup> Dword (input) descriptions when read command is 'Calibration Status'. Refer to 2<sup>nd</sup> Dword of PLC Output to FT-111 Input

Bit Number	1st Dw	ord (input) Description						
B31 B11	Not in u	ise						
	0	No Error						
B10	4	The Calibration DIP switch is not 'On' position.						
	1	- Check the calibration DIP switch.						
	0	No Error						
DO.	1	Scale unstable						
B9		- Wait until scale become stable						
		- Check grounding wiring						
	0	No Error						
B8	4	Calibration load value entry Error						
1		- Test weight is too small. Increase the weight						
	0	No Error						
		Calibration Error						
В7	1	- Calibration loading is not enough						
	1	- Check test weight loading						
		- Check load cell connections						
	0	No Error						
B6	1	Instrument cannot be calibrating						
	1	- Load cell signal is very low or too high						
	0	No Error						
B5		Instrument cannot be calibrating						
55	1	- Check load cell cable						
		- Re-energize the instrument						
	0	No Error						
B4		ADC Error						
2.	1	- Re-energize the instrument						
		- If seen again, change the board.						
	0	No Error						
B3	1	Calibration Timeout						
		- Restart calibration						
B2	0	None						
1		Span calibration in process						
B1	0	None						
	1	Zero calibration in process						
В0	0	Not ready for calibration						
	1	Ready for calibration						

Table 12-3 - Calibration status

PLC Output to FT-111 Input

1st Dword (OUTPUT)	Next [	Oword (	define	s the u	ısage o	f this D	word.				
2nd				Out 5	Out 4	Out 3	Out 2	Out 1	Expanded Co	mmands List	
Dword (OUTPUT)	Not in	use				Comr	mand L	ist		Read Data Selection	New CMD

Bit Number	Descriptions	Descriptions Set / Reset digital outputs								
B31 B24	Set / Reset digit	al outputs								
B23 B16	Expanded Comi		(Refer	to Table 12-4)						
B15 B11	Not in use									
		Bin	Dec	Commands						
		00000	0	None command is activated						
		00001	1	Zero						
		00010	2	Tare						
		00011	3	Clear						
		00100	4	Print						
		00101	5	Adjust zero calibration	Calibration					
		00110	6	Adjust span calibration (1)	Calibration					
		00111	7	Total Load Cell Capacity <sup>(1)</sup>	eCal					
		01000	8	Average mV/V value (1)	Coefficients					
		01001	9	Dead Load value <sup>(1)</sup>	Refer to par.					
		01010	10	Save the coefficients of eCal	[613]					
B10 B6	Command List	01011	11	CN (Label number) (1)						
		01100 01110	12 14	Not used						
		01111	15	Set Point-1						
		10000	16	Set Point-2						
		10001	17	Set Point-3						
		10010	18	Set Point-4						
		10011	19	Set Point-5						
		10100 11110	20 30	Not used						
		11111	31	Use the Expanded Command list (Refer to To	able 12-4)					
		00000	0	Actual weight ( Net if the indication	is in Net )					
		00001	1	Gross weight	·					
		00010	2	Tare weight						
		00011	3	ALL Status ( Refer to Table 12-2 )						
		00100	4	Calibration Status ( Refer to <i>Table 12-3</i>	)					
		00101	5	Last print value						
B5 B1	Read Data	00110 01010	6 10	Not used						
	Selection	01011	11	CN (Label number)						
		01100 01110	12 14	Not used						
		01111	15	Set Point-1						
		10000	16	Set Point-2						
		10001	17	Set Point-3						
		10010	18	Set Point-4						

		10011	19	Set Point-5
		10100	20	Not used
		11110	30	Not used
		11111	31	Use the Expanded Command list (Refer to Table 12-4)
во	New CMD	Toggle		Apply commands which are listed in this table.

<sup>(1)</sup> Write this command after writing values to 1st Dword, then apply this command with New CMD

## **Expanded Command List**

Here 1<sup>st</sup> Dword (Input) is the data receiving from PLC and the "B23 ... B16" bits describe below.

Bit No	Description	_					
		Bin	Dec	Comn			
					Voltage of Power sup	oply <sup>(2)</sup> (	Only FT-111 )
		00000000	0	R	The value is indicated	d with (	0.1 VDC increment
							ement for AC variant.
					Load cell millivolt val	ue <sup>(2)</sup>	
		00000001	1	R	Millivolt of active sca	ale is ind	dicated with 0.01
					mV increment.		
						Dec	Descr. of 1st Dword
						0	None
		00000010	2	R	Command status <sup>(2)</sup>	1	Command is processing
						2	Command is done
						3	Command failed
		00000011	3	R/W	Reprint the last	0	None
		00000011	3	K/ VV	label (1)(2)	1	Reprint the last label
		00000100	4	D /\A/	High	0	Enable
		00000100	4	R/W	resolution (1)(2)	1	Disable
		00000101	_	147	11-1-1-1-1	0	From first to second unit
		00000101	5	W	Unit change (1)	1	From second to first unit
		00000440		D // /	1 (1)(2)	0	Enable
		00000110	6	R/W	Key lock (1)(2)	1	Disable
		00000111	7	Not u	sod		
		00001101	13	NOT U			
		00001110				0	None
	Expanded				Alibi operation (1) (2)	1	Read stable weight and
B23B16	Commands						Record to Alibi
DZ3D10	List		14	R/W		2	Alibi number
	List					3	Net weight
						4	Tare weight
						5	Gross weight
		00001111 00111110	15 62	Not u	sed		
		00111111	63	R/W	Dynamic filter (1)(2)		Refer to par. 332 page 57
						0	No
						1	Very Low
					-11. (1) (2)	2	Low
		01000000	64	R/W	Filter (1) (2)	3	Medium
						4	High
						5	Very High
						0	Disable
						1	± %2
						2	± %2LK
		01000001	65	R/W	Power on zero (1)(2)	3	± %10
						4	+ %15, - %5
					5	± %20	
						0	Disable
					V Zeroing Range (1) (2)		± 2%
		01000010	66	R/W			± 3%
		1		11,7 00	1	2	- · · · / · ·

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B23B16   Expanded   Commands   List							4	± 50%
Auto Zero							+	
Note								
B23B16   Expanded   Expanded   List						Auto Zero	-	
B23B16   Commands   List   Expanded   Commands   List   Commands   List   Commands   Commands   List   Commands   Co			01000011	67	R/W			
B23B16   Commands List   Expanded   Commands List   Expanded   Commands List   Commands L						Tracking		
B23816   Commands   List   Expanded   Commands   List   Commands   Comma								
B23B16   Expanded   Commands List   Expanded   Commands List   Expanded   Commands List							_	
B23B16   Commands List   Expanded Li			01000100	68	R/\/	Tare (1)(2)		
Detection   Range (1)(2)   Refer to par. 517 page 61   Range (1)(2)   Range (1			01000100		11,7 **	Ture		
B23B16   Expanded Commands List   Expanded Commonds List   Expanded List   Ex								
Stability   2 ± 1d   3 ± 2d   3 ± 2d   4 ± 3d   5 ± 4d   6   Disable   7							_	
B23B16   Expanded   Expanded   Commands   List						Stability	<u> </u>	
B23B16   Expanded   Commands   List			01000101	69	R/\/		-	
Expanded   Commands   List   Expanded   Commands   Co			01000101	05	11,7 00		-	
B23B16   Expanded   Expanded   Commands List						Nange	-	
Expanded   Expanded   Commands List   Expanded   E								
Expanded   Commands List			04.000440	70	5 /11/	C. 1 :1:: T: (1) (2)	+	
Expanded Commands List			01000110	70	R/W	Stability Time (1) (2)	+	
Expanded Commands List							-	
Expanded Commands List							-	
Expanded Commands			01000111	71	R/W	Unit (1) (2)	-	
B23B16   Commands List   S   No   No   Single range   1   2 x Multi Range   2   3 x Multi Range   2   3 x Multi Interval   4   3 x XXXXX   S   XXXXXX   S   XXXXX   S   XXXXXX   S   XXXXX		Evpandod	02000222	-	,			lb
District    D22 D16								
01001000 72 R/W Range (1)(2)	B23B10							
01001000   72   R/W   Range (1)(2)   2   3 x Multi Range   3   2 x Multi Interval   4   3 x Multi Interval   6   1		List					0	
3   2 x Multi Interval   4   3 x Multi Interval   4   3 x Multi Interval   4   3 x Multi Interval   3 x Multi Interval   4   3 x Multi Interval   4   3 x Multi Interval   5 x XXXXXO   2   XXXXXO   2   XXXXXX   3   XXXXXX   4   XXXXXXX   5   XXXXXXX   5   XXXXXXX   5   XXXXXXX   5   XXXXXXX   5   XXXXXXX   5   XXXXXX   5   XXXX						(1) (5)	1	
A   3 x Multi Interval			01001000	72	R/W	Range (1) (2)	2	
01001001 73 R/W Capacity-1 (1) (2) Refer to par. 523 on page 62  0 XXXXOO 1 XXXXXO 2 XXXXXX 0 Decimal 2 XXXXXX 4 XXXX.XX 5 XXX.XXX 5 XXX.XXX 5 XXX.XXX 1 1 X2 2 X5  01001100 76 R/W Capacity-2 (1) (2) 01001101 77 R/W Decimal point-2 (1) (2) 01001110 78 R/W Increment-2 (1) (2) 01001101 79 R/W Capacity-3 (1) (2) 01010000 80 R/W Decimal point-3 (1) (2) 01010001 81 R/W Increment-3 (1) (2) 0 Over indication after Max 1 1 division more than Max							3	
0							•	
Decimal point-1 (1) (2)			01001001	73	R/W	Capacity-1 (1) (2)		
Decimal point-1 (1) (2)							0	
01001010 74 R/W point-1 (1) (2) 3 XXXXX.X 4 XXXX.XX 5 XXX.XXX 5 XXX.XXX 5 XXX.XXX 5 XXX.XXX								
01001010					R/W			
S			01001010	74	', ''	point-1 (1) (2)	3	
01001011 75 R/W Increment-1 (1) (2) 1 X2 2 X5  01001100 76 R/W Capacity-2 (1) (2) 01001101 77 R/W Decimal point-2 (1) (2) 01001110 78 R/W Increment-2 (1) (2) 01001111 79 R/W Capacity-3 (1) (2) 01010000 80 R/W Decimal point-3 (1) (2) 01010001 81 R/W Increment-3 (1) (2) 0 Over indication after Max 1 1 division more than Max								1
01001011 75 R/W Increment-1 (1) (2) 1 X2 2 X5  01001100 76 R/W Capacity-2 (1) (2)  01001101 77 R/W Decimal point-2 (1) (2)  01001110 78 R/W Increment-2 (1) (2)  01001111 79 R/W Capacity-3 (1) (2)  01010000 80 R/W Decimal point-3 (1) (2)  01010001 81 R/W Increment-3 (1) (2)  0 Over indication after Max  1 1 division more than Max							5	
2   X5						(1) (2)	-	
01001100 76 R/W Capacity-2 (1) (2) 01001101 77 R/W Decimal point-2(1) (2) 01001110 78 R/W Increment-2 (1) (2) 01001111 79 R/W Capacity-3 (1) (2) 01010000 80 R/W Decimal point-3(1) (2) 01010001 81 R/W Increment-3 (1) (2)  Unimit of Over indication after Max 1 1 division more than Max			01001011	75	R/W	Increment-1 (1) (2)		
01001101 77 R/W Decimal point-2 <sup>(1) (2)</sup> 01001110 78 R/W Increment-2 <sup>(1) (2)</sup> 01001111 79 R/W Capacity-3 <sup>(1) (2)</sup> 01010000 80 R/W Decimal point-3 <sup>(1) (2)</sup> 01010001 81 R/W Increment-3 <sup>(1) (2)</sup> 0 Over indication after Max 1 division more than Max							2	X5
01001110 78 R/W Increment-2 (1) (2) 01001111 79 R/W Capacity-3 (1) (2) 01010000 80 R/W Decimal point-3 (1) (2) 01010001 81 R/W Increment-3 (1) (2)  0 Over indication after Max 1 1 division more than Max				_	_			
01001111 79 R/W Capacity-3 (1) (2) 01010000 80 R/W Decimal point-3 (1) (2) 01010001 81 R/W Increment-3 (1) (2)  0 Over indication after Max 1 1 division more than Max				_	_			
01010000 80 R/W Decimal point-3 <sup>(1) (2)</sup> 01010001 81 R/W Increment-3 <sup>(1) (2)</sup> 0 Over indication after Max 1 1 division more than Max				_				
01010001 81 R/W Increment-3 (1) (2)  0 Over indication after Max 1 division more than Max			01001111	79	R/W	Capacity-3 (1) (2)		
0 Over indication after Max 1 1 division more than Max			01010000	80	R/W	-		
0 Over indication after Max 1 1 division more than Max			01010001	81	R/W	Increment-3 (1)(2)		
I I I I I I I I I I I I I I I I I I I							0	Over indication after Max
l la						Limit of	1	1 division more than Max
01010010 82 R/W Indication (1) (2) 2 9 division more than Max			01010010	82	R/W		2	9 division more than Max
Indication (2) 3 2% more than Max						indication (+/(+/	3	2% more than Max
4 5% more than Max							4	5% more than Max

Table 12-4 - Expanded Command List

- (1) Write this command after writing values to 1<sup>st</sup> Dword (Output) then apply this command with New CMD.
- (2) To access the related value, read 1st Dword (Input).

Programming steps of frequent used commands: Reading a weight value:

- 1. Check the B12...B15 bits of 'FT-111 Output to PLC Input 2<sup>nd</sup> Dword'.
- 2. If there is not any error, read the weight value (gross, net or tare).

#### Zero Calibration procedure:

- 1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
- 2. Write 'Adjust Zero Calibration' command and apply New CMD to start Zero calibration.
- 3. Check the Bit-1 of Calibration Status. it is '1'(set) during zero calibration process.
- 4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Zero calibration.
- 5. If the Bit-3°Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

#### Span Calibration procedure:

- 1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
- 2. Write 'Adjust Span Calibration' command after writing test weight values to 1<sup>st</sup> Dword, then apply this command with New CMD to start Span calibration.
- 3. Check the Bit-1 of Calibration Status. it is '1'(set) during span calibration process.
- 4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Span calibration.
- 5. If the Bit-3°Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

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# 13 APPENDIX 2: DATA STRUCTURE - CANOPEN

The write and read table are similarly structured and bitwise of a Unsigned Long (ULong) descripted below.

## FT-111 Output to PLC Input

#### Bitwise of a Dword:

	B61	B62	B61	B60	B59	B58	B57	B56	B55	B54	B53	B52	B51	B50	B49	B48
Unsigned Long	B47	B46	B45	B44	B43	B42	B41	B40	B39	B38	B37	B36	B35	B34	B33	B32
(Only read)	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
	B15	B14	B13	B12	B11	B10	В9	В8	В7	В6	B5	В4	В3	B2	B1	В0

## **FT-111 Output to PLC Input**

				Out 5	Out 4	Out 3	Out 2	Out 1					In 4	In 3	In 2	In 1
TxPDO 1 (T_UL1)	Erro	or code:	s of FT	-111	Unit			Centre of zero		SD	Re	ad com	nmand	respor	ise	Cmd Flg
		By default, Actual weight value is represented. To represent other weight or calibration status, refer to B33B37.														

# FT-111 Output to PLC Input 2<sup>nd</sup> Dword

Bit Number	TxPDO 1 (T_UL1)	Descriptio	n				
B63 B56	Digital Outputs	Output l	oit status	(Active = 1)			
B55 B48	Digital Inputs	Input bit	t status (	Active = 1)			
		Bin	Dec	Descriptions			
		0000	0	No error found			
		0001	1	ADC out			
	Error Codes	0010	2	ADC over			
B47 B44	of FT-111	0011	3	ADC under			
	0111 222	0100	4	System Error			
		0101	5	In programming mode			
		0110	6	Low/High Voltage Error			
		0111	7	Tilt Switch is active			
B43	Unit	0		First unit			
D43	Offic	1		Second unit			
B42-B41	Not used						
D40	Combine of some	0		Weight is out of zero range			
B40	Centre of zero	1		Weight is in zero range			
B39	Indication	0		Gross			
B39	indication	1		Net			
B38	Stability	0		Stable			
D30	Detection	1		Unstable			
B37 B33	Read Command	Bin	Dec	Descriptions			
D5/ B33		00000	0	Actual weight (Net if the indication is in Net)			
	Response		1	Gross weight			
		00010	2	Tare weight			

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		00011	3	ALL Status (Refer to Table 13.1)		
		00100	4	Calibration Status (Refer to Table 13.2)		
		00101	5	Last print value		
		00110	6	Not used		
		01010	10	1100 0300		
		01011	11	CN (Label number)		
		01100	12	Not used		
		01110	14	Not used		
		01111	15	Set Point-1		
		10000	16	Set Point-2		
		10001	17	Set Point-3		
		10010	18	Set Point-4		
		10011	19	Set Point-5		
		10100	20	Not used		
		11110	30	Not useu		
		11111	31	Use the Expanded Command list		
			<u> </u>	(Refer to Table 13.3)		
B32	CMD Flag	Toggles		The command is applied successfully		
B31B0	By default, Actual weight value is represented. To represent other weight or calibration status, refer to D33D37.					

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## ALL Status (always 32 bit integer)

Low Dword of TXPDO 1(T\_UL1) descriptions when read command is 'ALL Status'. Refer to RxPDO 1(R\_UL1) of PLC Output to FT-111 Input.

Bit Number	Low Dword of TxPDO 1(T_UL1) Description						
D24		0	None				
B31		1	No decimal point				
B30		0	None				
B30		1	Decimal point is X.X				
B29	Place of decimal point	0	None				
D29	Place of decimal point	1	Decimal point is X.XX				
B28		0	None				
DZO		1	Decimal point is X.XXX				
B27		0	None				
DZ/		1	Decimal point is X.XXXX				
B26 B14	Not in use						
B13	High receivation status	0	Passive				
B13	High resolution status	1	Active				
B12	Centre of zero	0	Weight is out of zero range				
D12	Centre of Zero	1	Weight is in zero range				
B11	Key lock status	0	Passive				
PII	Rey lock status	1	Active				
B10 B7	Not in use						
D.C.	I loit in disation	0	First Unit (power on unit)				
B6	Unit indication	1	Second Unit				
B5	Power On Zero	0	Not power on zeroed				
ВЭ	Power On Zero	1	Zeroed with power on zero				
B4	Not in use						
В3	Indication	0	Gross mode				
D3	muication	1	Net mode				
B2	Motion Detection	0	Stable				
DZ	Motion Detection	1	Unstable				
B1 B0	Not in use						

Table 13.1– ALL Status table

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## Calibration Status (always 32 bit integer)

Low Dword of TXPDO 1(T\_UL1) descriptions when read command is 'Calibration Status'. Refer to RxPDO 1(R\_UL1) of PLC Output to FT-111 Input.

Bit Number	Low D	w Dword of TxPDO 1(T_UL1) Description							
B31 B11	Not in use								
	0	No Error							
B10	1	The Calibration DIP switch is not 'On' position.							
	1	- Check the calibration DIP switch.							
	0	No Error							
DO		Scale unstable							
B9	1	- Wait until scale become stable							
		- Check grounding wiring							
	0	No Error							
B8	1	Calibration load value entry Error							
	1	- Test weight is too small. Increase the weight							
	0	No Error							
		Calibration Error							
B7	1	- Calibration loading is not enough							
	1	- Check test weight loading							
		- Check load cell connections							
	0	No Error							
B6	1	Instrument cannot be calibrating							
		- Load cell signal is very low or too high							
	0	No Error							
B5		Instrument cannot be calibrating							
63	1	- Check load cell cable							
		- Re-energize the instrument							
	0	No Error							
B4		ADC Error							
D4	1	- Re-energize the instrument							
		- If seen again, change the board.							
	0	No Error							
В3	1	Calibration Timeout							
	1	- Restart calibration							
B2	0	None							
DΖ	1	Span calibration in process							
B1	0	None							
חד	1	Zero calibration in process							
В0	0	Not ready for calibration							
טט	1	Ready for calibration							

Table 13.2 - Calibration status

# PLC Output to FT-111 Input

#### Bitwise of a Dword:

	B63	B62	B61	B60	B59	B58	B57	B56	B55	B54	B53	B52	B51	B50	B49	B48
Unsigned	B47	B46	B45	B44	B43	B42	B41	B40	B39	B38	B37	B36	B35	B34	B33	B32
Long (R/W)	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
	B15	B14	B13	B12	B11	B10	В9	В8	В7	В6	B5	В4	В3	B2	B1	во
				Out 5	Out 4	Out 3	Out 2	Out 1			Expan	ded Co	mman	ds List		
RxPDO 1 (R_UL1)		N	ot in u	se			Command List Read Data 9				ata Se	lection		New CMD		
		B33-B37 bits defines the usage of this Dword.														

PLC Output to FT-111 Input RxPDO 1 (R UL1)

Bit Number	RxPDO 1 (R_UL	RxPDO 1 (R_UL1) descriptions						
B63 B56	Set / Reset digital outputs							
B55 B48	Expanded Commands List (Refer to Table 13.3)							
B47 B43	Not in use							
		Bin	Dec	Commands				
		00000	0	No command is activated				
		00001	1	Zero				
		00010	2	Tare				
		00011	3	Clear				
		00100	4	Print				
		00101	5	Adjust zero calibration	0 111			
	Command List	00110	6	Adjust span calibration (1)	Calibration			
		00111	7	Total Load Cell Capacity (1)	eCal			
		01000	8	Average mV/V value (1)	Coefficients			
B42 B38		01001	9	Dead Load value <sup>(1)</sup>	Defeate			
D42 D30		01010	10	Save the coefficients of eCal	Refer to par. [613]			
		01011	11	CN (Label number) (1)	1			
		01100 01110	12 14	Not used				
		01111	15	Set Point-1				
		10000	16	Set Point-2				
		10001	17	Set Point-3				
		10010	18	Set Point-4				
		10011	19	Set Point-5				
		10100 11110	20 30	Not used				
		11111	31	Use the Expanded Command list (Refer to Table 13.3)				
D27 D22	Read Data	00000	0	Actual weight (Net if the indication is in Net)				
B37 B33	Selection	00001	1	Gross weight				
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		00010	2	Tare weight			
		00011	3	ALL Status (Refer to Table 13.1)			
		00100	4	Calibration Status (Refer to Table 13.2)			
		00101	5	Last print value			
		00110 01010	6 10	Not used			
		01011	11	CN (Label number)			
		01100 01110	12 14	Not used			
		01111	15	Set Point-1			
		10000	16	Set Point-2			
		10001	17	Set Point-3			
		10010	18	Set Point-4			
		10011	19	Set Point-5			
		10100 11110	20 30	Not used			
		11111	31	Use the Expanded Command list (Refer to Table 13.3)			
B32	New CMD	Toggle		Apply commands which are listed in this table.			
B31-B0	D33-D37 bits d	D33-D37 bits defines the usage of this Dword.					

<sup>(1)</sup> Write this command after writing values to Low Dword of RxPDO then apply this command with New CMD.

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## **Expanded Command List**

The "B48...B55" bits in RxPDO describes below.

Bit No	Description						
		Bin	De c	Con	nmands		
		00000000	0	R	Voltage of Power Supply <sup>(2)</sup> The value is indicated with 0.1 VDC increment for DC variant or 1 VAC increment for AC variant.		
			1	R	Load cell millivolt value <sup>(2)</sup> (only FT-111) Millivolt of active scale is indicated with 0.01 mV increment.		
						Dec	Descr. of 1st Dword
						0	None
		00000010	2	R	Command status <sup>(2)</sup>	1	Command is processing
						2	Command is done
						3	Command failed
		00000011	3	R/	Reprint the last	0	None
		00000011	,	W	label (1)(2)	1	Reprint the last label
		00000100	4	R/	High	0	Enable
		00000100		W	resolution (1) (2)	1	Disable
		00000101	5	w	Unit change (1)	0	From first to second unit
		00000101	,		Offic change	1	From second to first unit
		00000110	6	R/	Key lock (1) (2)	0	Enable
		00000110		W	Key lock (2) (2)	1	Disable
		00000111 00111110	7 62		Not used		
		00111111	63	R/ W	Dynamic filter (1) (2) Refe		Refer to par. 332 page 57
		01000000		R/ W	Filter (1) (2)	0	No
	Expanded					1	Very Low
B48B55	Commands		64			2	Low
	List					3	Medium
						4	High
						5	Very High
		01000001			Power on zero (1)(2)	0	Disable
						1	± %2
			65	R/		2	± %2LK
				W		3	± %10
						4	+ %15, - %5
						5	± %20
						0	Disable
				R/	(4) (0)	1	± 2%
		01000010	66	w	Zeroing Range (1) (2)	2	± 3%
						3	± 20%
						4	± 50%
				1		0	Disable
						1	± 0,3d
		01000011	67	R/	Auto Zero	2	± 0,5d
				W	Tracking (1)(2)	3	± 1d
				1		4	± 2d
				1		5	± 3d
				R/		0	No
		01000100	68	W	Tare (1) (2)	1	Multi tare
		<u> </u>		<u> </u>		2	Tare only at gross
			69	R/	Stability	0	± 0,3d
		01000101			Stability Detection	1	± 0,5d
				W	Range (1) (2)	2	± 1d
					nange ···	3	± 2d

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					4	± 3d
					5	± 4d
					6	Disable
	01000110	70	R/ W	Stability Time (1)(2)	Refe	er to par. [517] page 61
					0	g
					1	kg
	04000444	74	R/	Unit <sup>(1) (2)</sup>	2	t
	01000111	71	W	Unit (=) (=)	3	lb
					4	OZ
					5	No
					0	Single range
			5/		1	2 x Multi Range
	01001000	72	R/	Range (1)(2)	2	3 x Multi Range
			W	_	3	2 x Multi Interval
					4	3 x Multi Interval
	01001001	73	R/ W	Capacity-1 (1) (2)	Refe	er to par. 523 on page 62
					0	XXXXOO
					1	XXXXXO
			R/		2	XXXXXX
01001010	01001010	74	w		3	XXXXX.X
					4	XXXX.XX
					5	XXX.XXX
			- /		0	X1
	01001011	75	R/	Increment-1 (1) (2)	1	X2
			W		2	X5
	01001100	76	R/ W	Capacity-2 (1) (2)		
	01001101	77	R/ W	Decimal point-2 <sup>(1) (2)</sup>		
	01001110	78	R/ W	Increment-2 (1) (2)		
	01001111	79	R/ W	Capacity-3 (1)(2)		
	01010000	80	R/ W	Decimal point-3 <sup>(1) (2)</sup>		
	01010001	81	R/ W	Increment-3 (1) (2)		
					0	Over indication after Max
	01010010 8		Б/	Limit of	1	1 division more than Max
		82	R/ W	Limit of Indication (1)(2)	2	9 division more than Max
					3	2% more than Max
					4	5% more than Max
	7.11	. 40.0		anded Command List		

Table 13.3 - Expanded Command List

<sup>(1)</sup> Write this command after writing values to Low Dword of RxPDO then apply this command with New CMD.

<sup>(2)</sup> To access the related value, read Low Dword of TxPDO.

#### Programming steps of frequent used

## Reading a weight value:

- 1. Check the B47...B44 bits of TxPDO 1 (T\_UL1).
- 2. If there is not any error, read a weight value (gross, net or tare).

#### Zero Calibration procedure:

- 1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
- 2. Write 'Adjust Zero Calibration' command and apply New CMD to start Zero calibration.
- 3. Check the Bit-1 of Calibration Status. it is '1'(set) during zero calibration process.
- 4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Zero calibration.
- 5. If the Bit-3°Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

#### Span Calibration procedure:

- 1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
- 2. Write 'Adjust Span Calibration' command after writing test weight values to Low Dword of RxPDO 1(R\_UL1), then apply this command with New CMD to start Span calibration.
- 3. Check the Bit-1 of Calibration Status. it is '1'(set) during span calibration process.
- 4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Span calibration.
- 5. If the Bit-3°Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

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# **14 Error Codes**

FT-111 weighing terminal had been designed as a very reliable and virtually error free instrument. However, if there is an error occurs, do not attempt to repair the equipment before understanding what caused the error. Note the problems you have with your instrument and the error messages shown on the display. Then try to solve the problem according to the error table given below.

ERROR CODE	DESCRIBTION	THINGS TO DO		
	Weight is too low	- Check the load		
<u> </u>	Overload	- Load cell or instrument could be broken.		
LC Err	Load exceeds the operation range	<ul><li>Check the load</li><li>Check the calibration</li><li>Load cell or instrument could be broken.</li></ul>		
+POWERONZEROERR	Weight is out of power on zero	- Press key to start indication without		
-POWERONZEROERR	range.	zeroing and call service.		
DUE TO TILT	Announces the tilt position error.	<ul><li>Check the platform position.</li><li>Check parameter 51A.</li></ul>		
LOW VOLT PWR OFF	Power source voltage is less than 85 VAC for AC variant or 9 VDC for DC variant or 10.5 VDC for battery usage.	- Check the power supply voltage Charge the battery.		
E01 ADC ERROR	ADC initialization error.  ADC could not initialize at power on. ADC or its interface circuitry has a malfunction.			
E02 ADC ERROR	ADC conversion error.  ADC could not convert the load cell signal. ADC or its load cell connection circuitry may have a malfunction.	<ul> <li>Power off the instrument reenergizes it after 30 seconds.</li> <li>Check external load cell connection.</li> <li>Check load cell connector in the instrument.</li> </ul>		
E03 ADC ERROR	ADC data is out of the range. ADC could not convert the load cell signal in range. ADC or its load cell connection circuitry may have a malfunction or load cell excitation voltage is too low.	- Change main board		
E10 NVM VERSION	NVM version error. Factory default will be loaded.	<ul> <li>If you changed the E<sup>2</sup>ROM (U6) press enter key. The factory defaults will be loaded.</li> <li>If not, change main board. If this error occurs after a software update, install the previous software to avoid deleting your installation.</li> </ul>		
E20 CALIBRATION	Checksum error of calibration coefficients.	<ul><li>Check the scale performance.</li><li>Recalibrate the scale.</li><li>Change mainboard.</li></ul>		
E21 SETUP ERROR	Check sum error of parameters.	<ul> <li>Check the scale performance.</li> <li>Recalibrate the scale.</li> <li>Change mainboard.</li> </ul>		
E22 CHECKSUM ERR	Checksum error of the data.	- Change E <sup>2</sup> ROM (U6).		
E23 HEADER ERR	Header checksum error.	<ul> <li>Press enter key and re-enter the headers.</li> <li>Change E<sup>2</sup>ROM (U6).</li> </ul>		
E24 FOOTNOTE ERR	Footnote checksum error.	<ul> <li>Press enter key and re-enter the footers.</li> <li>Change E<sup>2</sup>ROM (U6).</li> </ul>		
E25 FBUS SETUP E	Fieldbus set up error.	- Press enter key and re-enter the fieldbus		

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	T	cotus				
		setup. - Change E <sup>2</sup> ROM (U6).				
		- Press enter key and re-enter the set point				
E26 SET POINT ERR	Set point (limit values ) checksum	(limit) values.				
	error.	- Change E <sup>2</sup> ROM (U6).				
		- Change CR2032 battery.				
E28 CLOCK ERROR	Clock error.	- Change the main board.				
	Checksum error of EPL printout	- Press enter key and re-load the EPL code				
E32 LABEL ERROR	format.	- Change E <sup>2</sup> ROM (U6).				
FOANOTIOARER	ADC output is not changed for	- Recalibrate the scale.				
E34 NOT LOADED	the span calibration.	- Change mainboard.				
E35 LC CONNECTIO	The load cell output is decreased	- Check load cell connections.				
ESS LC CONNECTIO	after loading.	- Check test weight loading.				
E36 ADD LOAD	The load is not enough for span	- Recalibrate the scale.				
E36 ADD LOAD	calibration.	- Change mainboard.				
		- Wait until scale become stable.				
E37 UNSTABLE	The load is not stable at	- Check grounding wiring.				
EST GNSTABLE	calibration.	- Recalibrate the scale.				
		- Change mainboard.				
	Alibi memory SD card is not	- Disable Alibi memory if not required.				
E40 NO ALIBI SD	installed.	- Check Alibi SD card.				
		- Change mainboard.				
E44 ALIDI EALILE	Alibi SD card is not supplied from	to stall Elista a Alibi CD and				
E41 ALIBI FAULT	FLINTEC.	- Install Flintec Alibi SD card.				
	Alibi memory serial number					
E42 NEW ALIBI	error. The new alibi SD card is	- Format the alibi memory SD card.				
CTZ IVEVV ALIDI	installed.	Refer to parameter 816.				
E43 ALIBI ERROR	Alibi memory could not be	- Check alibi memory SD card				
	initialized.	- Change main board.				
E44 ALIBI CSUM E	Alibi CSUM error.	Charle alibi management records				
E44 ALIBI CSOWI E	Alibi esolvi error.	<ul> <li>Check alibi memory records.</li> <li>Change Alibi memory SD card.</li> </ul>				
E47 ALIBI CSUM E	Alibi information CSUM error.	- Change Main board.				
E47 ALIBI COOM E	7 mor macion esolvi error.	- Change main board.				
E48 ALIBI SD ERR	Wrong SD card at alibi memory.	- Order Alibi SD card.				
E61 FLASH ERROR	E <sup>2</sup> PROM Error.	- Change main board.				
		- Check data format of other interfaces.				
E70 MB SELECT ER	Modbus selection error	- Other interfaces should not be Modbus.				
		- Reverify the scale after checking the				
E80 VERIFY SCALE	Re-verification of the scale.	scale hardware, load cells, performance				
		etc.				
		- Check the DLC connection (RS-485 &				
		Power supply) hardware.				
E81 CANNOT ADDR	DLC could not addressed.	- Check the DLC and S/N.				
		- Load default to DLC by par. 995 and				
		then try again.				
		- Check addressing is done correctly.				
	Shift adjustment is not available	- Check test weight loading on				
E82 SHIFT ADJUST	due to load cell coefficients are	the correct DLC.				
	out of limits.	- Check the load cell installation and				
		scale installation.				
		- Reenergize the indicator.				
E83 DLC COUNT ER	No regular response from load	- Check the DLC connection (RS-485 &				
	cell	Power supply).				
		- Change load cell.				

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E84 SN NOT MATCH DLC yy <sup>(1)</sup>	The address and S/N of the load cell do not match.	- Check the DLC and S/N Reenergize the indicator Readdress the DLC.
E85 DLC TIMEOUT DLC yy <sup>(1)</sup>	Communication time out	- Check the DLC connection (RS-485 & Power supply) hardware Check the DLC and S/N.
E86 DLC COM ERR DLC yy <sup>(1)</sup>	Status error of load cell	- Change load cell.
E87 DLC UNDER DLC yy <sup>(1)</sup>	The DLC is under	- Check mechanical installation and DLC.
E88 DLC OVER DLC yy <sup>(1)</sup>	The DLC is over	- Check mechanical installation and DLC.
E89 DLC CHKSUM DLC yy <sup>(1)</sup>	Checksum error	- Check termination resistors Check the DLC connection (RS-485 & Power supply) hardware.
E90 DLC PWR ERR	Power supply of DLCs could not detected.	- Check the power supply connection. - Change the LPK24.
E91 DLC SYSTEM	Internal communication error between the DLC board and the indicator.	- Change the DLC board. - Change the main board.
E92 DLC UNMATCH	Capacity of the load cell is different.	- Check capacity of the DLC

<sup>1)</sup> yy = Number/Address of the digital load cell.

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