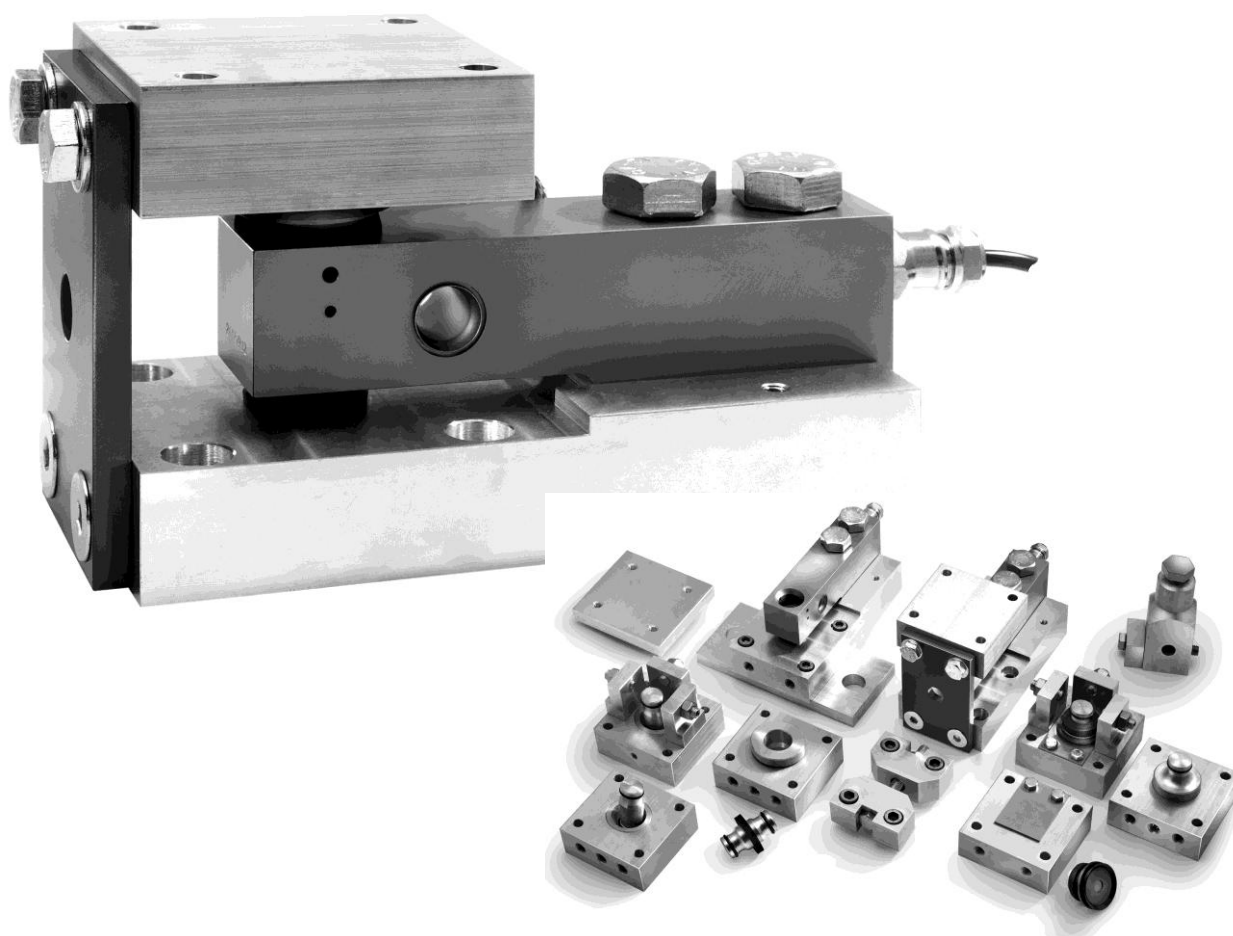


Application Guidelines for Weigh Modules type 52-18RS and 52-18SS



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Drawing No 2-9023. Assembly drawing of Weigh Module 52-18RS-50kN (Rocking System)	
Drawing No 2-9026. Assembly drawing of Weigh Module 52-18SS-50kN (Sliding System)	
Drawing No 3-8758. Procedure for installation without use of welding fixtures.	

Brief Product Description

Type 52-18 weigh modules are designed for load cells type SB4, SB5, SB14 and SLB and are available in **2 basic versions**, 52-18RS employing the **Rocking System** and 52-18SS employing the **Sliding System**.

The weigh modules are being delivered preassembled and centered with an Aligning Plate for easy installation.

Both versions have identical outer dimensions and utilize same mounting principles, but have somewhat different features. Some features are overlapping and which version is the optimal choice depends on the actual application.

The 52-18RS-C with its **Rocking Load Introduction and Internal Bumping**, is the first choice for static load applications, because:

- It is easiest to install.
- All weigh modules in a scale are identical.
- Modules can be oriented freely in any direction.
- It is the most cost effective version.

However, this module is not suitable for tanks with agitators, which rotating movement might cause the scale to oscillate, as it is standing on rockers.

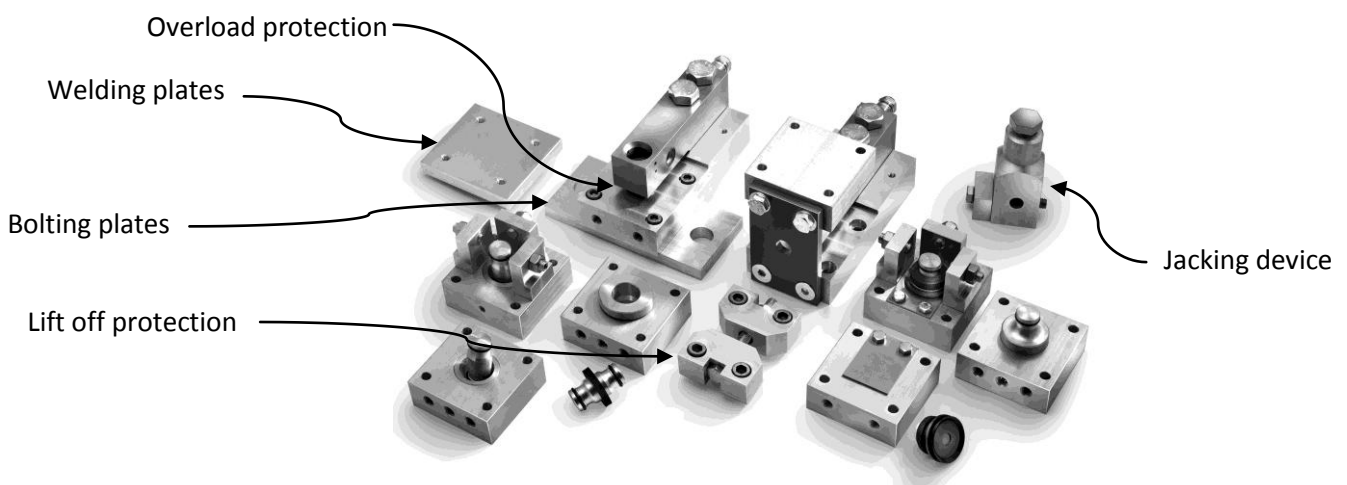
For agitator applications, the 52-18SS, with **Sliding Load Introduction and external bumping** shall be used. This module is also the choice when very large expansions due to temperature or other reasons are expected. This module can tolerate side forces up to as much as 100% of rated load, whereas the 52-18RS-C is limited to 50%.

The selection guide below further illustrates when to use which module.

Type of application	52-18RS (Rocking System)	52-18SS (Sliding System)
Static load applications	X	X
Scales with agitator	1)	X
Scales with large temperature expansions		X
High resolution applications	X	

1) Possible with close adjusted bumpers and special orientation.

The 52-18 is a modularized weigh module which means that it comes in a basic version, which can be fitted with a number of options as required for the actual application:



Principle of Rocking System

The rocking pin is “self centering”. The pin has relatively large radiuses (larger than ½ the pin height) and therefore the rocker strives to stand straight up. With pins in vertical position, or near to vertical position, possible horizontal forces between the load cells are zero, or very close to zero, which enhances repeatability and thus the accuracy of the scale. The Rocking System is the most accurate load introduction system there is for multi load cell scales.

The Rocking System comes in 2 versions. With rocking pin bumping internally in the loading cup (figure 1), respectively with regular rocking pins and external bumpers (figure 2).

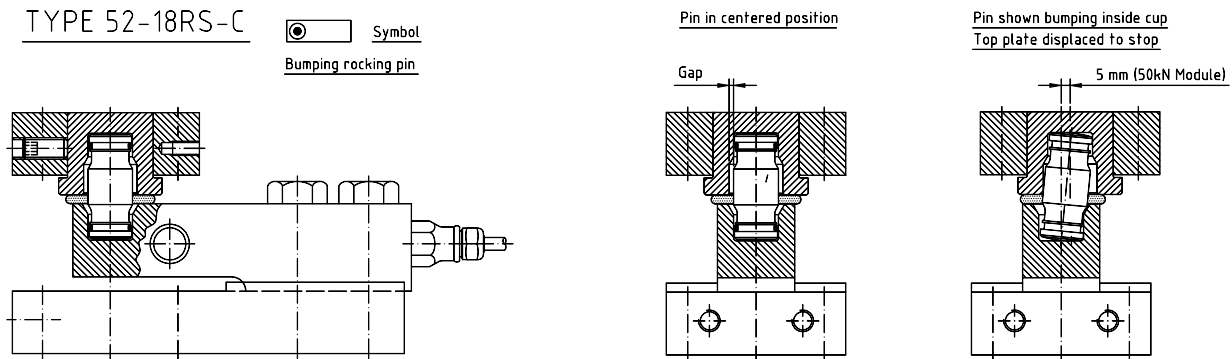


Figure1. Type 52-18RS-C. Module with pin bumping internally in loading cup.

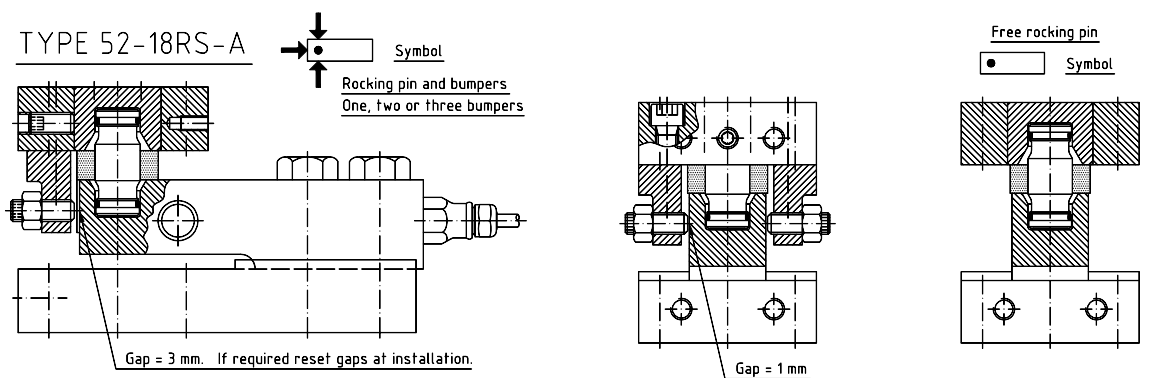


Figure 2. Type 52-18RS-A. Module with external bumpers.

Figures 3 and 4 below show a few examples of how to orient the Rocking System weigh modules.

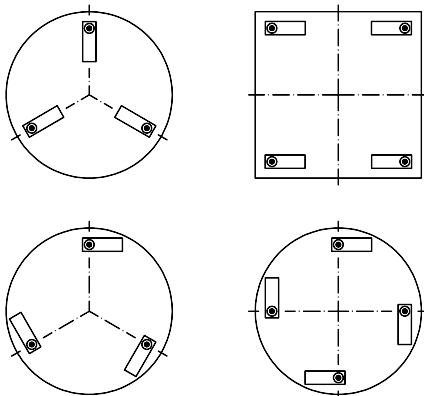


Figure 3. Orientation with internally bumping pins.

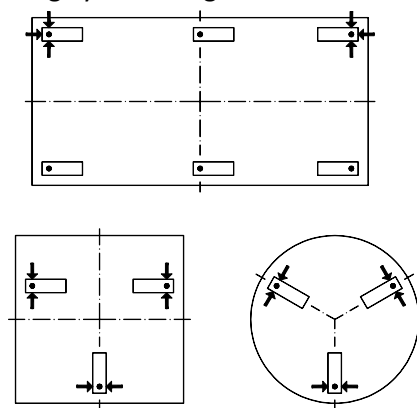


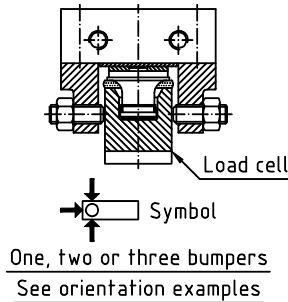
Figure 4. Orientation with external bumpers.

Principle of Sliding System

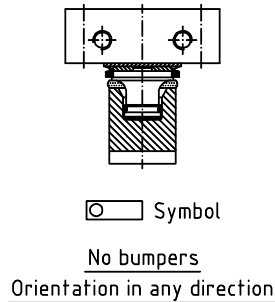
The Sliding System is based on loading pins fitted with Teflon (PTFE) sliding plates sliding against Stainless Steel Sheets with very smooth surface (Surface finish 2B). This surface combination gives a very low friction coefficient (typ < 5-6%). It allows length changes of the load carrier to take place, without causing any considerable horizontal forces between the load cells.

TYPE 52-18SS SLIDING SYSTEM

Section of 52-18SS-A
(sliding pin and bumpers)



Section of 52-18SS-B
(free sliding pin)



Section of 52-18SS-C
(fixed pin)

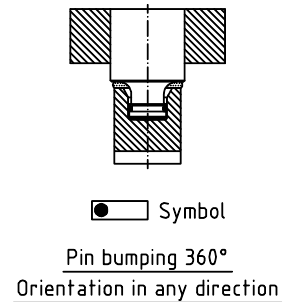
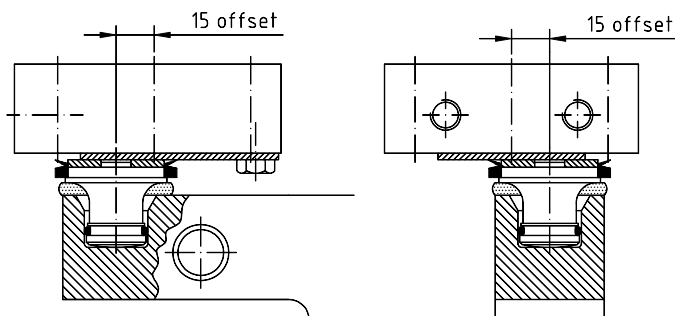


Figure 5. Type 52-18SS Variants with bumpers, without bumpers, resp. with fixed pin.

Movement of the load carrier is restricted by bumpers acting against the loading end of the load cell. A module can have 1, 2 or 3 bumpers, or no bumpers at all. It can also have a “fixed loading pin” which acts as a 360° bumper.

These variants make possible a large number of bumper combinations. Which variant is the optimal choice depends on the actual application. One combination which works well for most types of load carriers is: “one fixed pin module, one module with 2 bumpers and all other weigh modules free sliding”.



The Sliding System is perfect for applications which exhibit very large temperature expansions.

Figure 6 illustrates that that the top plate of a 50kN module can be positioned offset, by as much as 15 mm and still function. This also means that the centering of the sliding modules during installation is not very critical.

Figure 6. Top plate of -50kN module, shown offset by 15 mm.

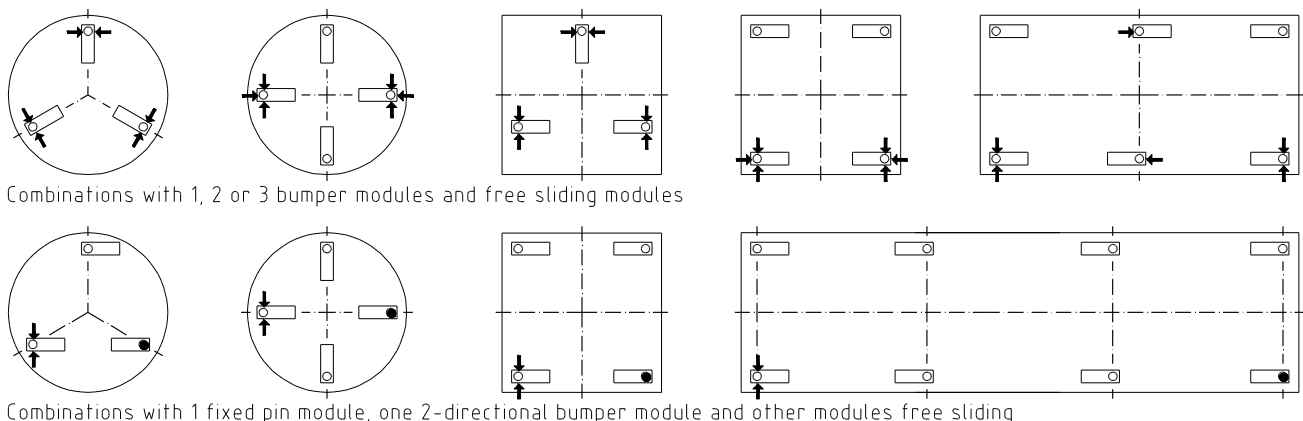


Figure 7. This figure shows some typical examples on how to orient the Sliding System weigh modules.

Preassembled Weigh Module/function of Aligning Plate

The weigh modules are delivered preassembled and centered with an **Aligning Plate**, for easy installation.

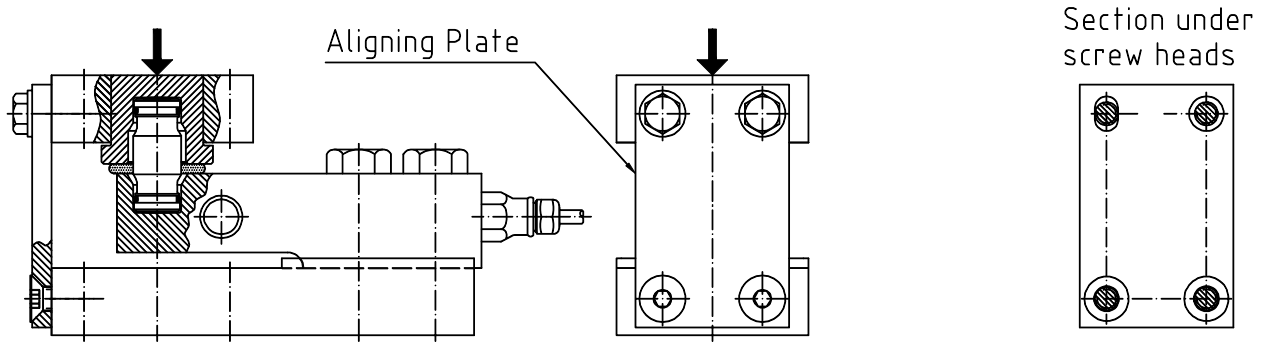


Figure 8

Figure 8 shows the preassembled weigh module 52-18RS-C with internally bumping rocking pin.

The lower 2 screws in the aligning plate are both conically recessed and thus these screws hold the plate in exact aligned position in relation to the base plate. The upper 2 screws in turn hold the top plate in centered position relative to the base plate.

One of the upper 2 holes in the aligning plate is vertically oblong with tight fit to the screw, while the other hole has large clearance to the screw. This allows the top plate to adjust to the tank foot, in case the foot is not exactly parallel to the foundation plate. The upper 2 screws are therefore just slightly torqued, in order to allow such angular movement during installation.

Jacking Device

As an option a jacking device is available to lift the load carrier, in case a load cell needs to be replaced.

See figure 9. The jacking device is secured to the base plate with 2 screws which fit the 2 holes earlier used for the above described aligning plate. The device has alternative pairs of holes to be used with resp. without welding or bolting plates.

Any other jacking device that fits between load carrier and foundation can, of course, also be used.

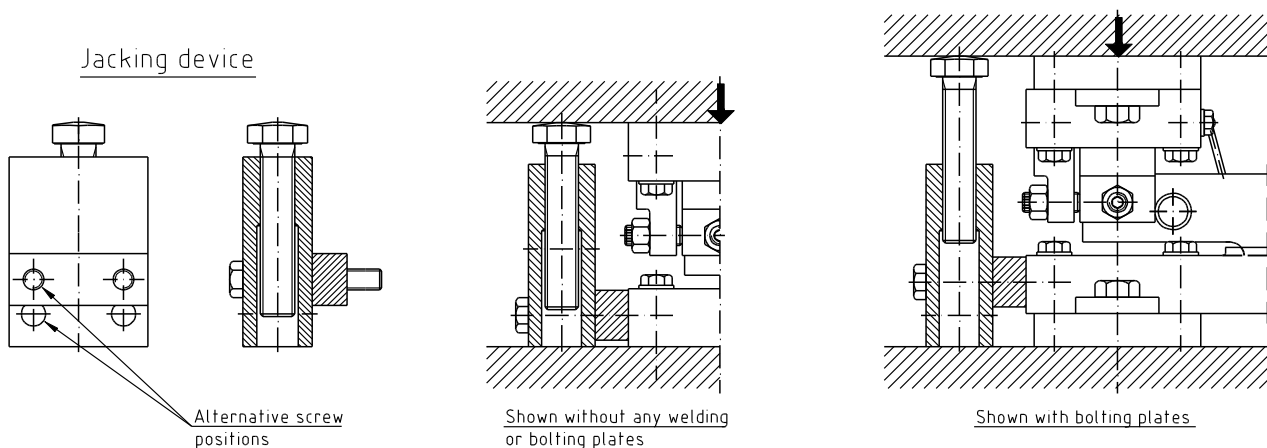


Figure 9

Figure 10

Figure 11

Lift off protection.

An optional lift off protection can be fitted after the installation of the weigh module. It utilizes the same holes which, before installation, were used with the alignment plate to hold the module together.

In most indoor applications the tanks or hoppers never see any wind forces or other side forces, which could cause lift off. Lift off protection should therefore only be added when required.

The lift off bolt has large clearance to the upper and lower brackets which allows the rocking or sliding motion of the module without interference. The lift off gap can be set by rotating the nut on the screw prior to mounting.

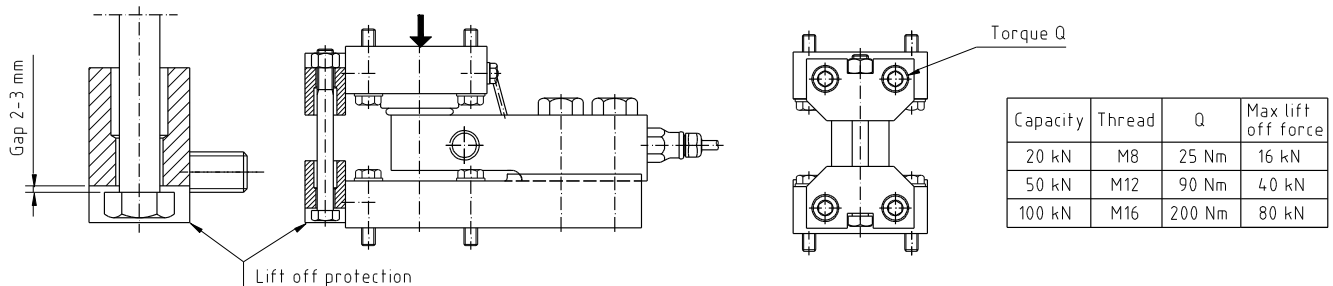


Figure 12.

Overload protection

As yet another option, the weigh modules can be fitted with an overload stop, which protects the load cell in case of an overload. The overload stop is simply the head of a hex head screw, which stops the down movement of the loading end of the cell. Thanks to the relatively large deflection of the shear beam, the gap between the cell and the screw head is easy to set by inserting shim washers under the head. The table below shows recommended gaps which are selected to be ca 30 – 40 % more than the deflection of the cell at nominal load. The actual gap can be measured by using a feeler guage. If the load cell is to be utilized to less than nominal load, the gap can preferably be reduced in proportion. With overload stop fitted, the cell will be protected to at least 5 times nominal load.

A rubber V-ring prevents dirt from entering the gap.

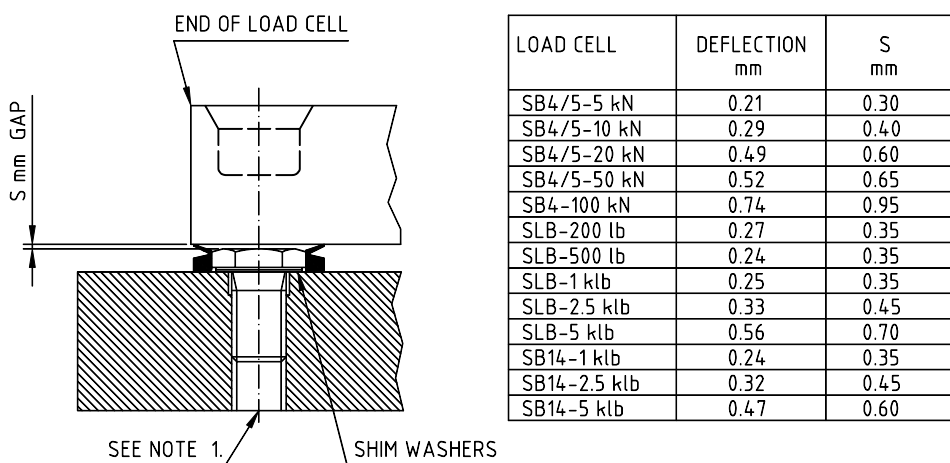


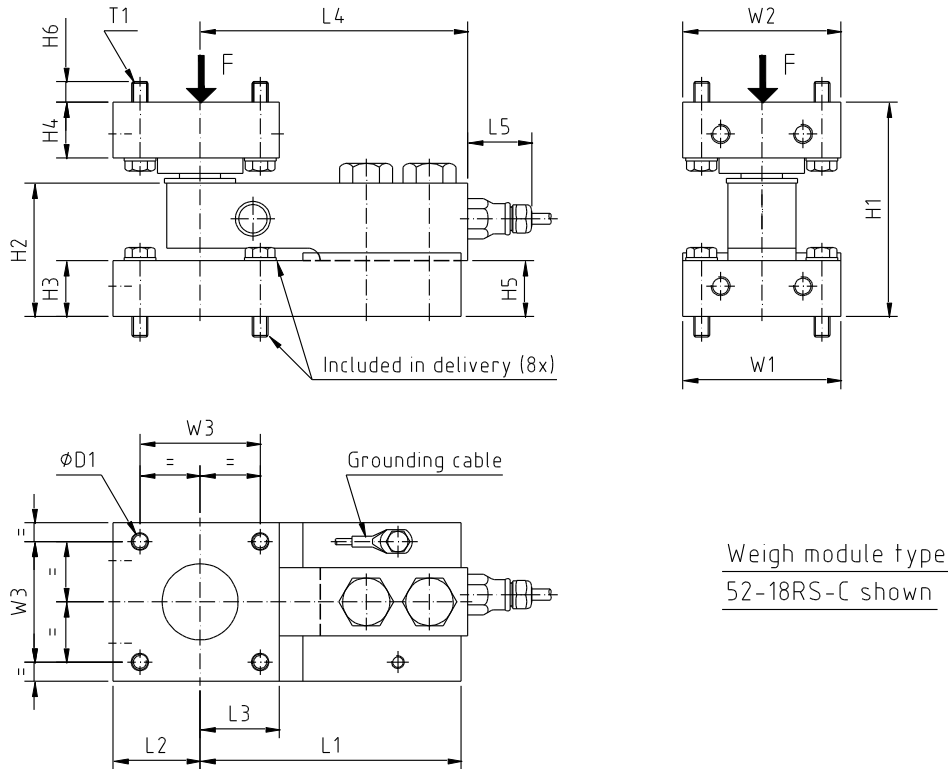
Figure 13.

- NOTE: 1. MAKE SURE THREAD HAS BEEN MADE IN THE ACTUAL BASE PLATE. THE THREAD IS AN OPTION TO BE SPECIFIED IN ORDER.
2. QUANTITY OF SHIM WASHERS AS REQUIRED.

Dimensions

Below is an Outline Drawing which also can be found on the 52-18 Data Sheet. It covers all capacities of 52-18 in their basic form, i.e. without liftoff protection, welding plates or bolting plates.

A combined Assembly/Outline drawing for each individual capacity, which is more detailed, is available on request. As an example, this drawing for the 50kN capacity weigh module, can found in the enclosures section. Same drawing, for the actual capacity weigh module, is always included in the delivery.



Weigh module type
52-18RS-C shown

LOAD CELL TYPE	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	W1	W2	W3	D1	T1
SB4/SB5-5...20 kN	100	63	25	25	27	13.5	130	45	40	140	41	80	80	58	9	M8
SB14-0.5...5 klb	101	64	"	"	33	"	120	"	"	121	41	"	"	"	"	"
SLB-0.2...5 klb	100	63	"	"	"	"	"	"	"	124	19	"	"	"	"	"
SB4/SB5-50 kN	135	84	35	35	35	13	165	55	50	169	41	100	100	76	11	M10
SB14-10 klb	"	"	"	"	40	"	155	"	"	159	"	"	"	"	"	"
SB4/SB5-100 kN	195	128	55	50	55	17.5	205	80	60	215	41	120	150	90	13.5	M12

Figure 14.

Data

WEIGH MODULE TYPES			MAX FORCE F	MAX SIDE FORCE
Rocking System	52-18RS-A	With Rocking pin and bumpers	200% of Emax	100% of Emax
	52-18RS-B	With free rocking pin	200% of Emax	n. a.
	52-18RS-C	With bumping rocking pin	200% of Emax	50% of Emax
Sliding System	52-18SS-A	With sliding pin and bumpers	200% of Emax	100% of Emax
	52-18SS-B	With free sliding pin	200% of Emax	n. a.
	52-18SS-C	With fixed pin	200% of Emax	100% of Emax

Emax= Maximum load cell capacity

For **Max lift off force data**, see section "Lift off protection".

CAD files, for copying and pasting into customer's own application drawings, are available on request or by downloading from Flintec web page www.flintec.com. From these files the applications engineer can select his preferred combination of basic unit plus options, to copy and paste into his application drawing.

2D CAD files

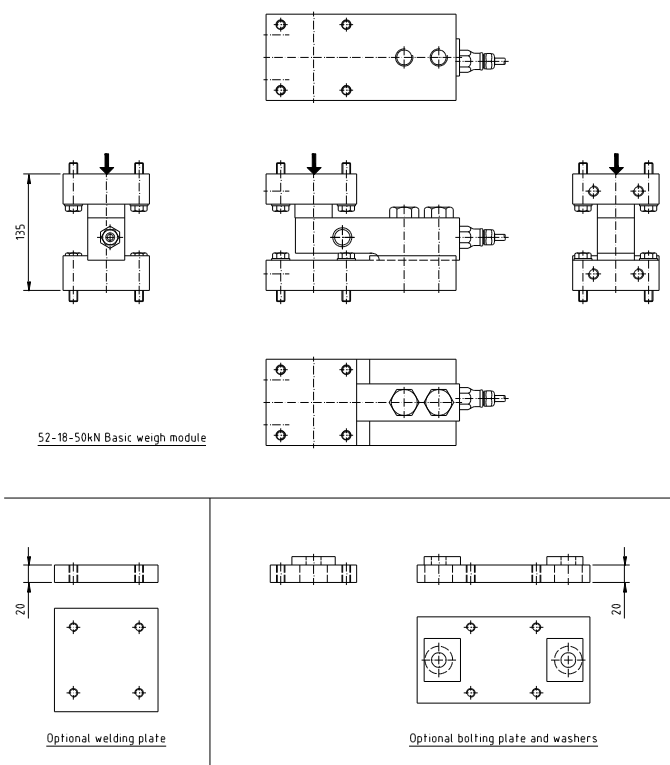


Figure 15. Figure shows 2D views of the 50 kN module and optional welding and bolting plates.

3D CAD files

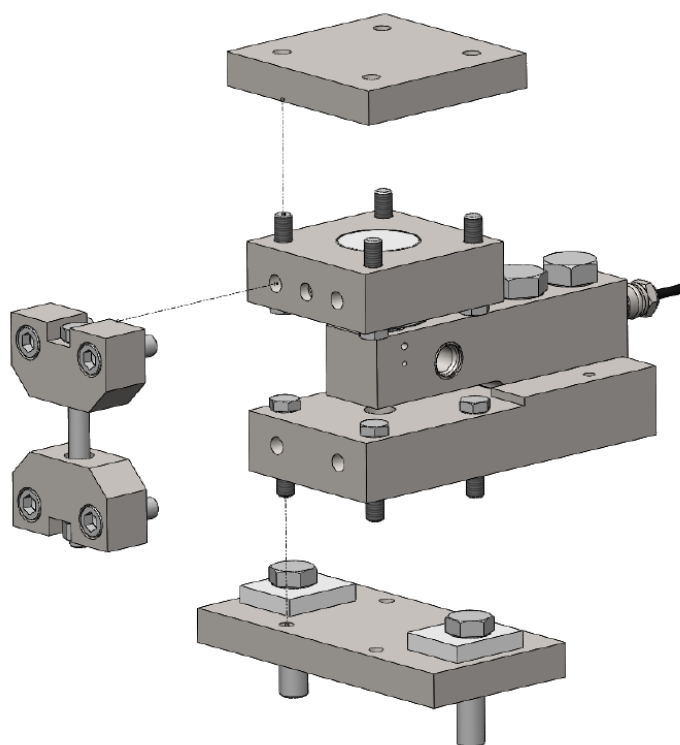
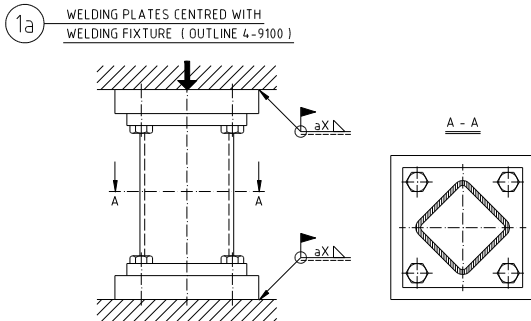


Figure16. Figure shows a 3D model of the 50 kN module with options.

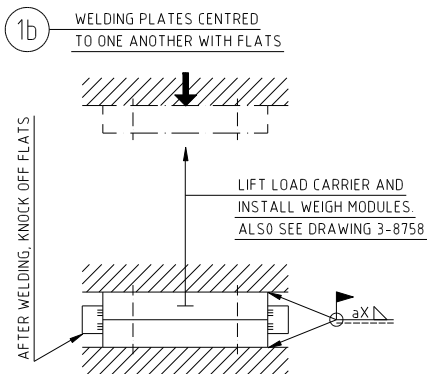
Installation

A large number of installation methods are available.

For large tanks and hoppers it is usually impossible to position mounting holes in load carrier resp. in the foundation structure accurately enough to allow insertion of all mounting screws. The use of **Welding Plates** or **Bolting Plates**, the latter having pre drilled extra large mounting holes, are therefore convenient methods to solve this problem. Some of these alternatives are shown below.



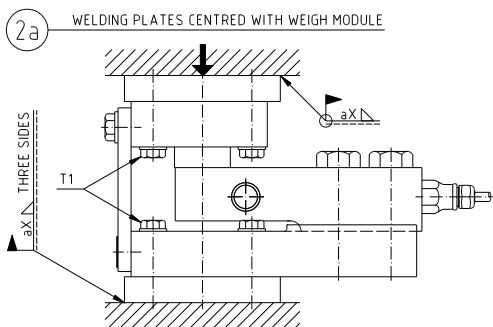
-**Figure 1a** shows how welding plates on top and on bottom can be accurately installed using a welding fixture.



-**Figure 1b** shows how same welding plates can be accurately installed without the use of a welding fixture.

The welding plates, in this case, are delivered centered to one another with a pair of "knock-off flats". A requirement for this alternative is that the load carrier can be lowered down deep enough to apply tack welds to hold each of the plates in position. When this has been done, the flats are to be knocked off, load carrier lifted and welding finalized.

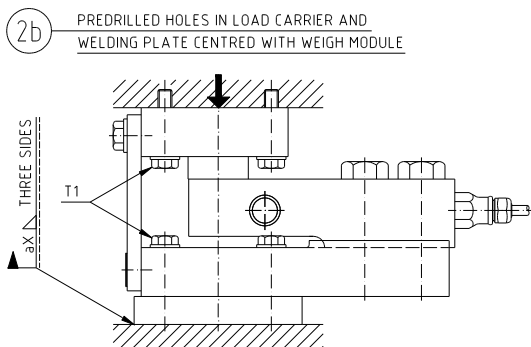
Enclosure 3-8758 describes this method more in detail.



-**Figure 2a** shows a case where the weigh module itself acts as a fixture for holding the welding plates in position.

Note that the welding plates are slightly bigger than the top resp. the bottom plates. This makes it easy to hold a piece of sheet metal against the welding plate to protect the weigh module from weld splashes.

When welding, make sure that the ground cable of the welding machine is connected to the same side at which the welding is done, so that no current flows through the load cell. Load cell cable should preferably not be connected in the summing box during welding.



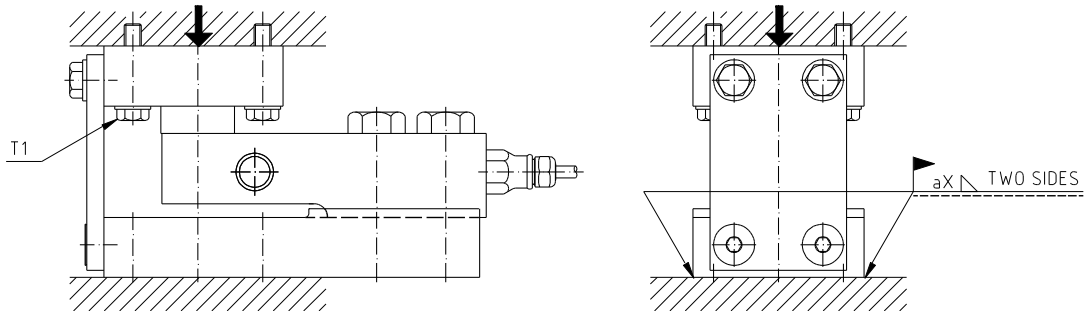
-**Figure 2b** illustrates a case where the load carrier has been prepared with mounting holes from factory.

The weigh module holds the welding plate in position against the foundation, ready for welding.

This method opens the possibility of pre-installing the modules to the load carrier in the factory and deliver, ready for the final welding operation on site. Cables, summing boxes etc. can in this case preferably also be pre installed "on board" the load carrier.

3

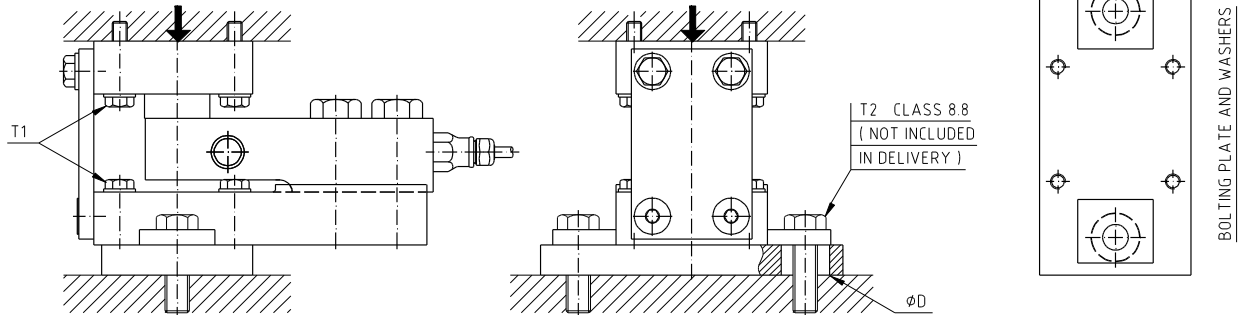
PREDRILLED HOLES IN LOAD CARRIER AND WEIGH MODULE WELDED DIRECTLY TO FOUNDATION



-Figure 3 is similar to 2b, but in this case, the base plate of the weigh module is welded directly to the foundation plate without any welding plate in between.

4

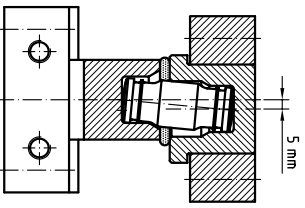
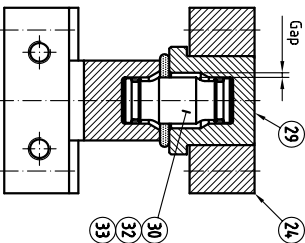
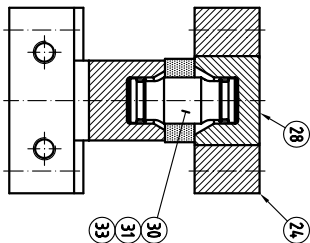
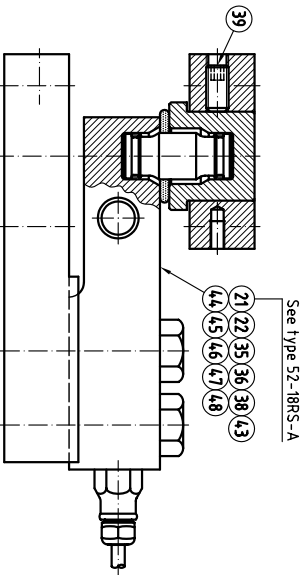
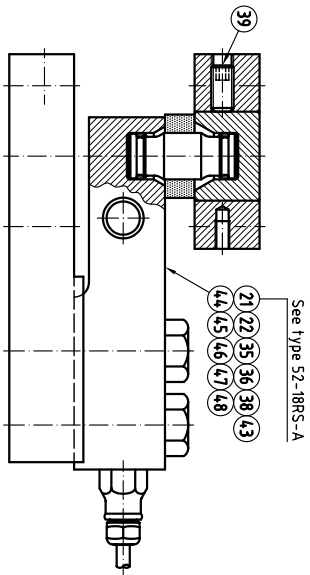
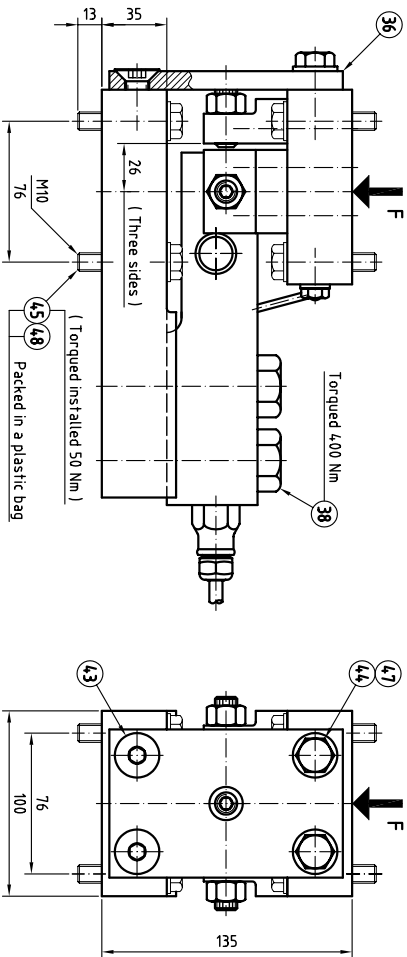
PREDRILLED HOLES IN LOAD CARRIER AND BOLTING PLATE CENTRED WITH WEIGH MODULE




-Figure 4 shows a case with pre-drilled mounting holes both in load carrier and in foundation and where the weigh module has been fitted with a bolting plate on bottom side. The bolting plate has extra large clearance holes for the mounting bolts, which can compensate for a considerable misplacement of the mounting holes. With bolting plates both on top and bottom the compensation range is doubled.

WEIGH MODULE WITH LOAD CELL TYPE	T1 / TORQUED	T2 / TORQUED	φD	WELD SIZE X
SB4/SB5-...20kN AND SB14/SLB-...5klb	M8 (8.8) / 25 Nm	M12 (8.8) / 90 Nm	26 mm	4 mm
SB4/SB5-50kN AND SB14/SLB-10klb	M10 (8.8) / 50 Nm	M16 (8.8) / 200 Nm	32 mm	5 mm
SB4/SB5-100kN	M12 (10.9) / 115 Nm	M20 (8.8) / 400 Nm	40 mm	6 mm

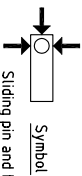
-The above table shows weld sizes and torques required to withstand the max specified side forces of a weigh module. For applications with no, or very small, side forces, these values of course can be selected differently.



MODULE TYPE	MAX FORCE F	MAX SIDE FORCE	MAX LIFT OFF FORCE	MAX JACKING FORCE
52-18RS-A	200% of E max	100% of E max	4.0 kN	100 kN
52-18RS-B	200% of E max	n. a	4.0 kN	100 kN
52-18RS-C	200% of E max	50% of E max	4.0 kN	100 kN

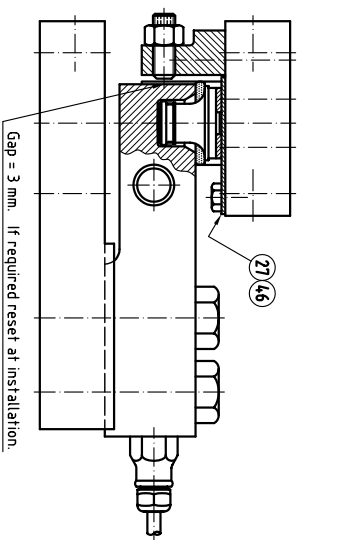
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1	1	1	1	Designation <input type="text"/> Size <input type="text"/>	
WEIGHT MODULE TYPE 52-18RS (ROCKING SYSTEM) WITH SB4/SB5-50-KN AND SB14-10-KN ASSEMBLY / OUTLINE DRAWING					
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2-9023					1

TYPE 52-18SS-A

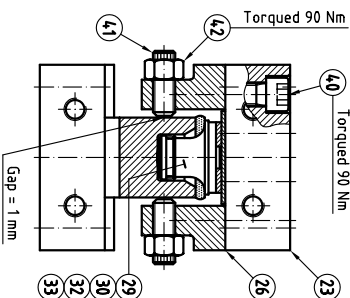


Parts list, zinc plated: 4-9024-A
Parts list, stainless: 4-9025-A

Sliding pin and bumpers
One, two or three bumpers

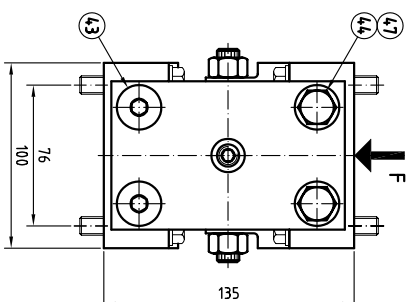
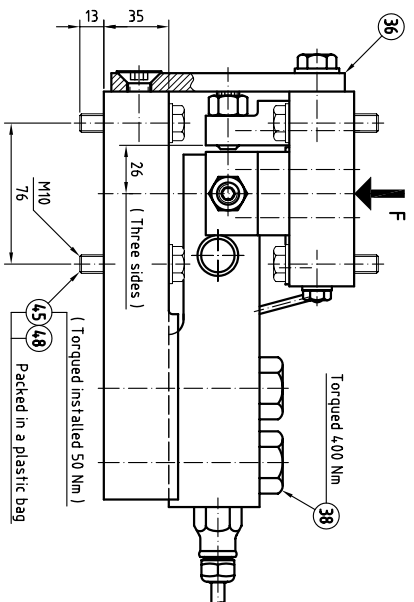


Final bumping gap will be set at installation

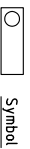


(TYPE 52-18SS-A)

Sections and additional details to the left

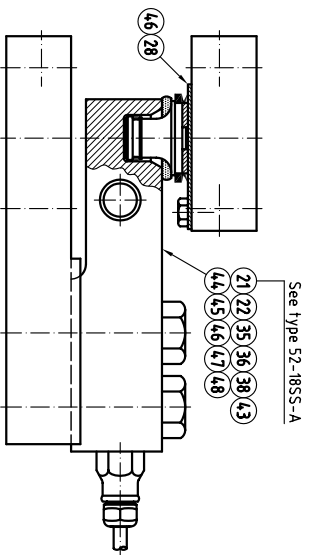


TYPE 52-18SS-B

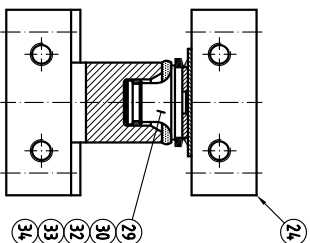


Parts list, zinc plated: 4-9024-B

Free sliding pin



See type 52-18SS-A

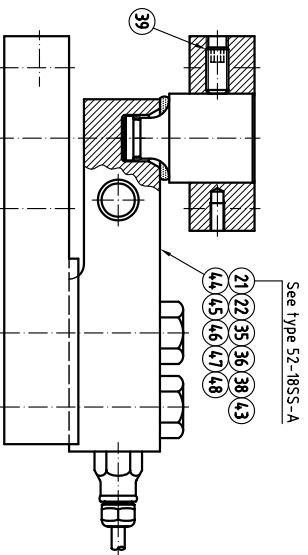


TYPE 52-18SS-C

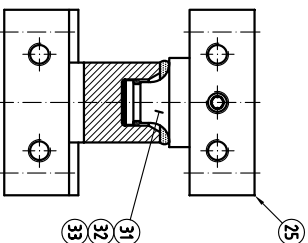


Parts list, zinc plated: 4-9024-C


Fixed pin



See type 52-1855-A

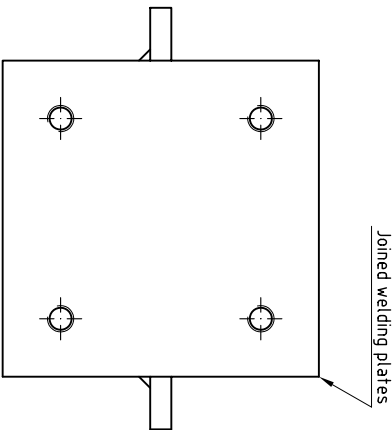
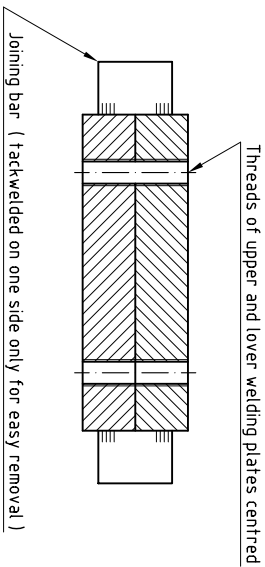
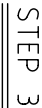
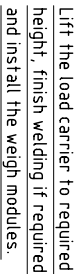
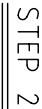
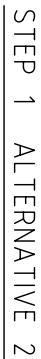
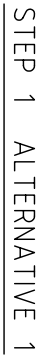
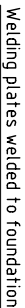
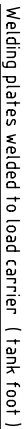


MODULE TYPE	MAX FORCE F	MAX SIDE FORCE	MAX LIFT OFF FORCE	MAX JACKING FORCE
52-1855-A	200% of E max	100% of E max	4.0 kN	100 kN
52-1855-B	200% of E max	n. a.	4.0 kN	100 kN
52-1855-C	200% of E max	100% of E max	4.0 kN	100 kN

Qty	Group	Item	Description	Material / Qty No	Remarks
D	C	B	A	N A N A K N	
			07-03-26	12	
WEIGH MODEL TYPE 52 - 8BS5 (SLIDING SYSTEM)					
WITH SB4/SB5-SO AND SB14/-10-KIB					
ASSEMBLY / OUTLINE DRAWING					
					
Tolerance, un-					
less otherwise					
specified acc. to					
Hole for medium					
ISO 101 to 142.					
Sheet					
Drawing No.					
2-9026					
of					
1					
FLINTEC					

RELATED DRAWINGS:

- 4-9123 CAD-file drawing with SB4/SBS-50 kN
- 4-9124 CAD-file drawing with SB14/SLB-10 k1b
- 4-9086 Assembly / cad-file for lift off protection
- 4-9129 Orientation drawing
- 4-9130 Installation examples
- 4-9131 Application guidelines



Rev	Date	Sign/ Appr	Description
1	070601	N.A./K.N	Redrawn

Qty		Group		Item	Description		Material/Dwg No	Remarks
D	C	B	A	N/A	N/A	KN	05-09-11	Scale —
JOINED WELDING PLATES FOR WEIGH MODULE TYPE 52-18 PROCEDURE FOR INSTALLATION WITHOUT USE OF FIXTURES								Drawing No 3—8758 of 1 Rev No