

# MAST JACK MANUAL

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## ATTENTION!

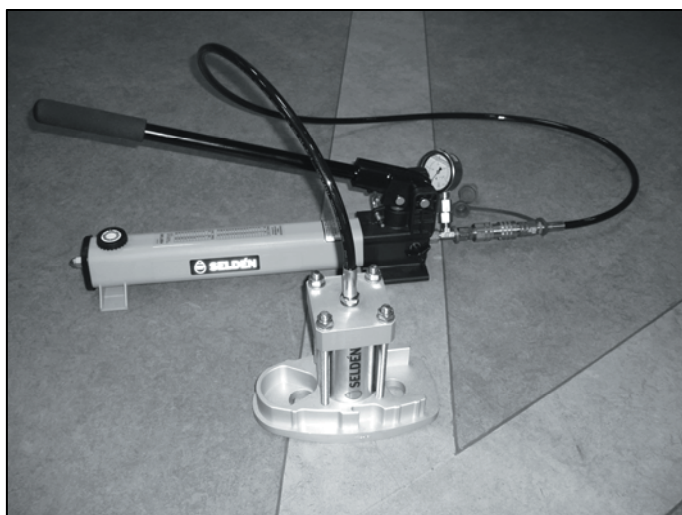
**High loads – keep clear to avoid injuries.**

**Always keep an eye on the rig to avoid over-tensioning – lowers and intermediates must be slack before pumping up the mast.**

## General

- This instruction describes how to install, use and maintain Seldén's integrated mast jack systems D63/400 & D80/400.
- Two people are required for the installation job.
- Same height (keelson to edge of mast tube) as for standard heel + standard adjustable mast base.
- On furling masts, the sail compartment wall (middle wall) must be cut to make room for the cylinder. Contact Seldén for further instructions.
- Pump is factory set to 400 bar. System components are designed for max 400 bar.
- Separate pump instruction is supplied with the pump unit.
- Load/pressure conversion tables can be found on page 7 (table 3.a & 3.b) and on top of hand pump.
- All quick couplings are leakage free.
- To ensure low friction between mast and deck ring wedges, silicone (or Teflon™) spray should be used. Spray on mast. Do not spray on deck ring or on wedge surfaces facing deck ring.
- See drawing PS749 for mast jack and pump main dimensions.

Mast section:	Mast jack system:	Max load at 400 bar:
CC210, C211 CC226, C227 CC244, C245	System D63/400 (Cyl. Ø 63 mm):	125 kN (~12,5 tons)
CC263, C264, F265 CC285, C285, F286 CC303, C304, F305	System D80/400 (Cyl. Ø 80 mm):	200 kN (~20 tons)



## Replacing mast heel



**Note! On furling masts, the sail compartment wall (middle wall) must be cut to make room for the cylinder. Use a compass saw to remove enough material for the cylinder to fit properly inside the mast. Grind all sharp edges.**

### Tools needed:

Drilling machine	Fine file (half-round)	M6 tap
Drill bits Ø 6.5 mm & Ø 4.9-5.0 mm	Pop rivet gun	Tap wrench
Hole saw Ø 28-29 mm	Torx key T30	Silicone spray
Compass saw (C211 only)	Locking adhesive (Loctite 639)	

1. Remove the old mast heel. Use drill bit 6.5 mm to remove the rivets.
  2. Cut out for cable and hose exits, see fig. 2. Grind edges carefully.
  3. On carbon masts make sure to replace the old heel insulator with the new one supplied for the mast jack heel.
  4. Cut away ~100mm of the cable conduit. Use a compass saw and be careful not to damage the electric cables.
  5. On mast section C211; cut off ~100 mm of the cable conduit track (in the mast section).
  6. Feed all electric cables out through the new exit hole (not through the hydraulic hose exit).
  7. Insert mast jack assembly and keep the heel pushed up/forward tightly against the mast (heel max forward with no gap between mast and heel) and drill-mark the holes for the new fasteners.
  8. Remove mast jack assembly and drill (Ø 4.9-5.0 mm ) and tap M6 for the new fasteners.
  9. Insert mast jack assembly and feed the hydraulic hose out through the hose garage exit. Make sure that the electric cables do not jam.
  10. If hose garage is to be used, go to step 11 before fastening the heel.
  11. Remove all metal chips and dirt and fasten mast jack assembly with screws. Use plenty of locking adhesive on the screws to avoid corrosion.
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12. If hose garage is to be used: use hose garage as a template and mark the holes before drilling 6.5 mm. Use insulating lacquer on contact surfaces to prevent corrosion.
  13. Drill hole #1 with garage as template, then place a pop-rivet in the hole to keep the “garage/template” in position and drill hole #2. Place a pop-rivet in the second hole...etc. until all four holes are drilled.
  14. Spray the hydraulic hose with silicone spray to make it slide easily inside the mast.
  15. Feed the hydraulic hose into the mast and out through the hose exit hole and hold the heel close to the mast end so that the hose forms a bend inside the mast
  16. Fit hose garage inside mast with pop rivets. See fig. 2. Make sure that the hydraulic hose is lead down into the garage from above and that it can be slid easily up and down through the garage/exit.
  17. Remove all metal chips and dirt and fasten mast jack assembly with screws. Use plenty of locking adhesive on the screws to avoid corrosion.

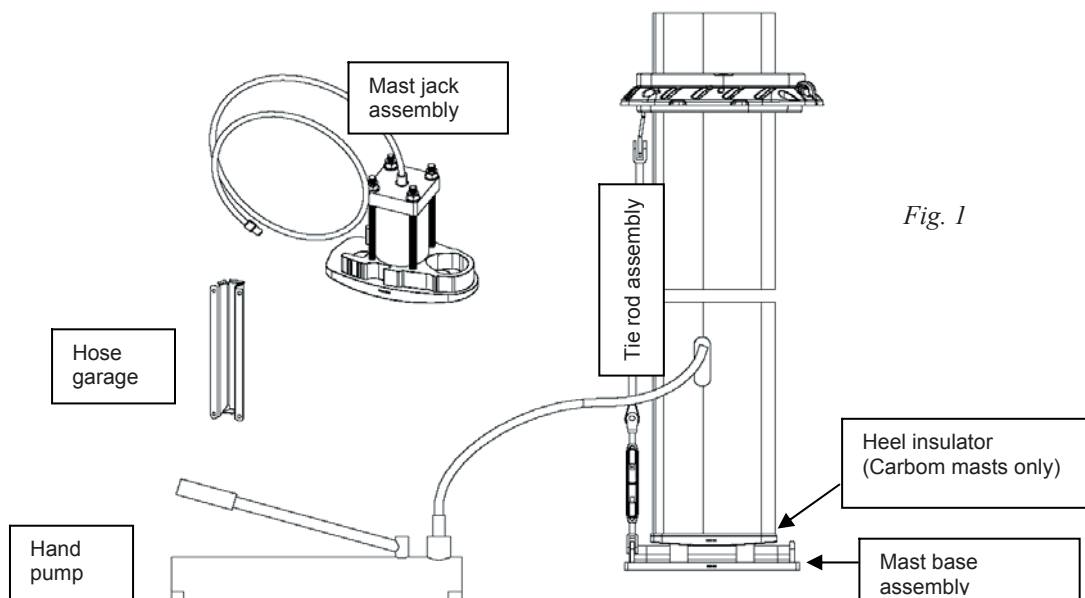


Fig. 1

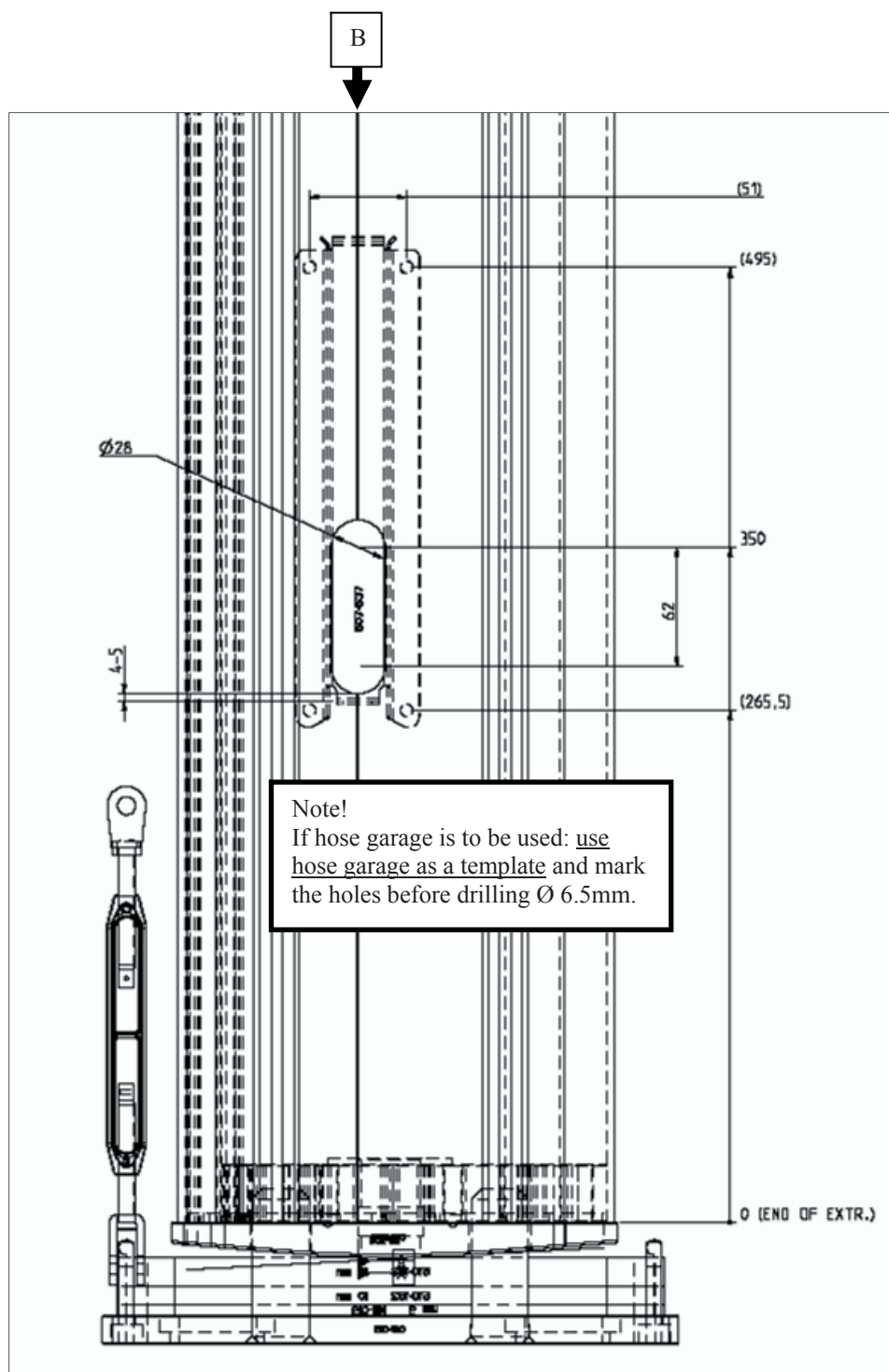


Fig. 2

## Replacing mast base

If tie rod bracket 508-309 is used make sure that the aft u-bolt is fitted.

If mast leash is to be used make sure that the forward u-bolt is fitted.

1. Remove old mast base.
2. Fit new mast base with supplied washers and screws.

Note: adjusting mast base location can not be done once the mast is raised.

## Tie rod bracket 508-309

Reference drawing: PS718.

### Tools needed:

Vernier caliper	Counter sink (90°)
Pencil	File or grinding pin
Driftpin	Torx key T40
Drilling machine	Locking adhesive (Loctite 639)
Drill bit Ø 6.0-6.5 mm	Drill jig 592-119/120-01
Drill bit Ø 9 mm	

1. Use a file to grind away ~30 mm of the pad shelf, flush with main surface of deck ring, see fig. 3.b. This is to allow correct fitting of the tie rod bracket.
2. Drill two Ø 6 mm holes at c/c 20 mm as shown below, see fig. 2.a and 2.b. Using the appropriate drill jig is recommended, see table 1. Note that the holes must be drilled from inside of deck ring when using the drill jig and that this will limit the size of drilling machine that can be used.
3. Enlarge the holes to Ø 9 mm.
4. Countersink both holes for the MFT M8 screw heads, see fig. 3.a and 4.b.
5. Fit tie rod bracket with the supplied MFT screws; short screw in the upper hole (see table 1). Use locking adhesive on screws and screw heads to lock the screws and prevent corrosion.
6. Make sure that both screws go just through the tie rod bracket.
7. Cut aft deck ring pads if necessary to achieve a proper fit.



Fig. 3.a

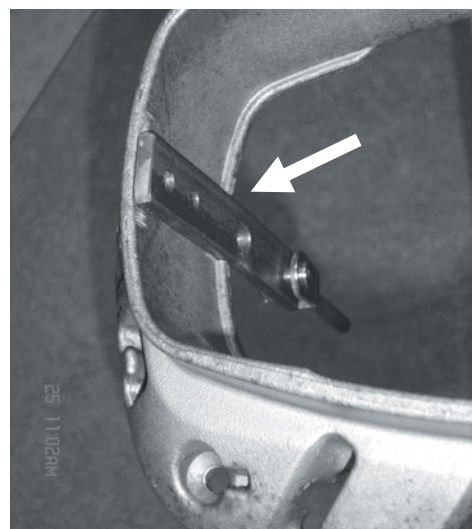


Fig. 3.b

Mast section	Deck ring	Hole location, A (mm)	Drill jig	Upper screw	Lower screw
CC210, C211 CC226, C22	533-022	12	529-119-01	MFT 8x11	MFT 8x20
CC244, C245 CC263, C264, F265	533-023	12	529-119-01	MFT 8x11	MFT 8x20
CC285, C285, F286 CC303, C304, F305	533-024	18	529-120-01	MFT 8x16	MFT 8x20

Table 1

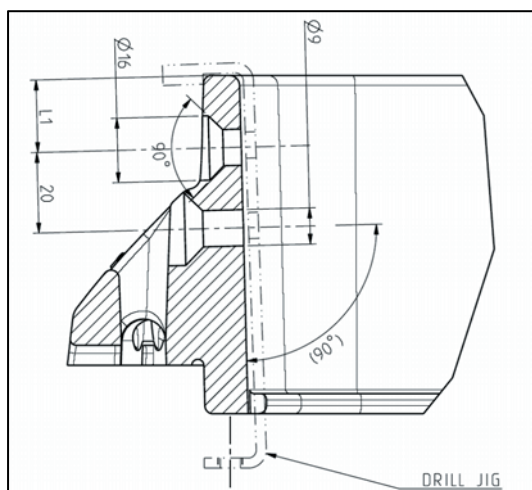


Fig. 4.a

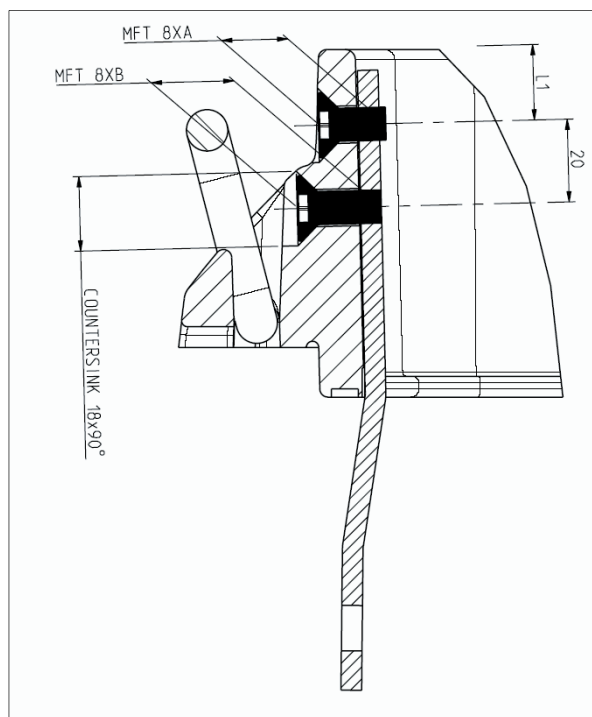


Fig. 4.b

## Fitting tie rod

If tie rod bracket 508-308 is used:

1. Fit fork terminal to tie rod bracket. Note: clevis pin head towards mast. Apply tape around fork and pin head to avoid damaging the mast.
2. Fit rigging screw to aft U-bolt in mast base.
3. Tighten rigging screw to eliminate slack in the wire before pumping the mast up.

## Stepping and tuning

- Before stepping the mast make sure that the right amount of shims is used, see table 2. Also make sure that the shims are secured with the supplied locking pins.
- To ensure low friction between mast and deck ring wedges, silicone (or Teflon™) spray should be used. Spray on mast. Do not spray on deck ring or on wedge surfaces facing deck ring.
- Cut aft deck ring pads if necessary to make room for tie rod bracket.



**Important! Thickest shims on top.**

1. When stepping the mast, make sure to keep cables and hydraulic hose clear.
2. Apply silicone (or TEFLON™) spray on the mast and/or on the deck ring pads – MAST SIDE ONLY! – to ensure low friction between mast and pads as the mast moves up and down.
3. Tune the mast as you normally would, see **Hints and Advice**. Max pre-tension 25% of wire breaking strength. Note! All shims to be in place when pre-tensioning the rig.

Mast section	Total shim height (mm)
C211, CC210	30
C227, CC226	30
C245, CC244	30
C264, F265, CC263	35
C285, F286, CC284	35
C304, F305, CC303	35

Table 2

## Fitting leash

Some ocean racing rules require arrangements to keep the mast fixed to the boat in the event of mast failure. If mast leash is required, fit leash with shackle in the forward mast base u-bolt. With the mast stepped and tuned for racing (max amount of shims under the mast heel) stretch the leash and mark for the holes on front of mast. Make sure to allow for min. 5 mm extra rising of the mast.



## Releasing rig tension

Before releasing rig tension by lowering the mast, make sure to keep clear from moving parts both at keelson and at deck level. Remove mast coat if necessary. Also keep an eye on the deck ring pads. They should slide against the mast. If necessary, apply silicone (or TEFLON™) spray between mast and pads.

1. Make sure that the pump valve is open before connecting pump to mast jack. Open by turning wheel counter clockwise. See fig. 5.
2. Connect the pump by pushing the male and female quick couplings together. The quick coupling can be locked by turning the ring on the female coupling on the pump.
3. Close the pump valve by turning the wheel clockwise.
4. Pump the mast up just so that the shims can be removed.
5. Remove the desired amount of shims.
6. Carefully and slowly release pressure (Turn wheel on pump unit counter clockwise).
7. Before disconnecting pump, make sure that the pump valve is open.

## Resetting rig tension

Before releasing rig tension by lowering the mast, make sure to keep clear from moving parts both at keelson and at deck level. Remove mast coat if necessary. Also keep an eye on the deck ring pads. They should slide against the mast. If necessary, apply silicone (or TEFLON™) spray between mast and pads.

1. Make sure that the pump valve is open before connecting pump to mast jack. Open by turning wheel counter clockwise. See fig. 5.
2. Connect the pump by pushing the male and female quick couplings together. The quick coupling can be locked by turning the ring on the female coupling on the pump.
3. Close the pump valve by turning the wheel clockwise.
4. Pump the mast up just so that the shims can be removed.
5. Pump the mast up just so that the desired amount of shims can be inserted. **Note! Thickest shim on top.**
6. Secure shims with the supplied pins.
7. Carefully and slowly release pressure. (Turn wheel on pump unit counter clockwise.)
8. Before disconnecting pump, make sure that the pump valve is open.
9. Refit the mast coat if necessary.

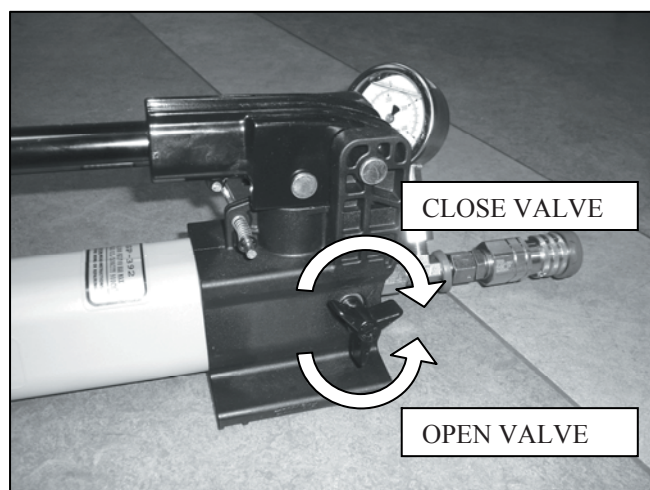


Fig. 5

## Conversion tables

### SYSTEM D63/400

(Cyl. Ø 63 mm)

#### Mast sections:

CC210, C211

CC226, C227

CC244, C245

Pressure → Load	
BAR	kN
0	0
40	13
80	25
120	38
160	50
200	63
220	69
240	75
260	81
280	88
300	94
320	100
340	106
360	113
380	119
400	125

Load → Pressure	
kN	BAR
0	0
20	64
40	136
50	160
60	192
70	224
80	256
90	288
100	320
110	352
120	384
125	400

Table 3.a

### SYSTEM D80/400

(Cyl. Ø 80 mm)

#### Mast sections:

CC263, C264, F265

CC285, C285, F286

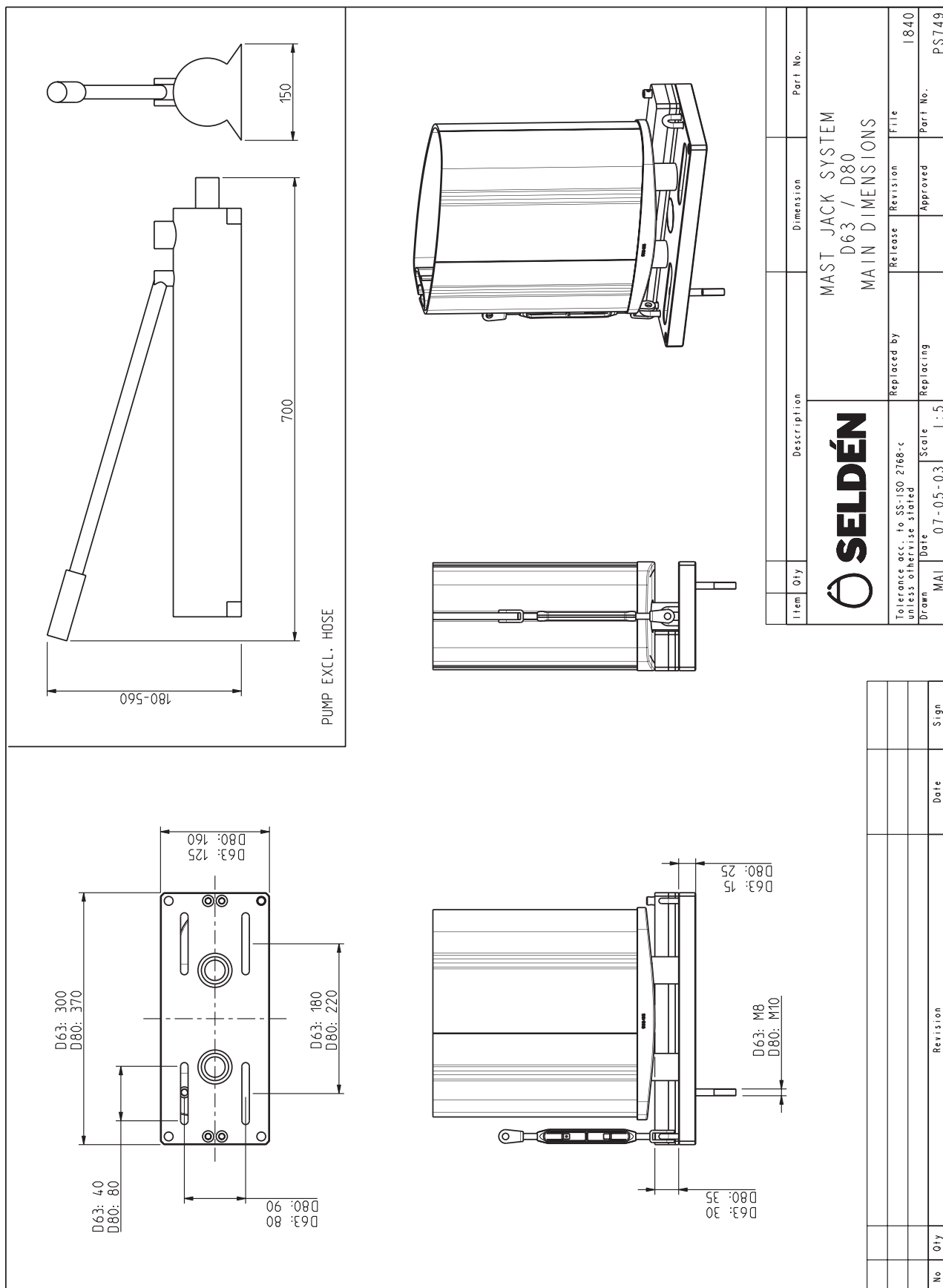
CC303, C304, F305

Pressure → Load	
BAR	kN
0	0
40	20
80	40
120	60
160	80
200	100
220	110
240	120
260	130
280	140
300	150
320	160
340	170
360	180
380	190
400	200

Load → Pressure	
kN	BAR
0	0
20	40
40	80
60	120
80	160
100	200
110	220
120	240
130	260
140	280
150	300
160	320
170	340
180	360
190	380
200	400

Table 3.b





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