Hydraulic systems 2

Dimensioning


SELDÉN

1   Introduction

HYDRAULIC SYSTEMS 2 – DIMENSIONING contains documentation of interest for internal use at Seldén. It's available as a pdf-file, and it can be revised without notice.

2   Definition of hydraulic hose length

The illustration below indicates how to measure the length of hydraulic hoses. These couplings are the most common and they might appear in different combinations on one hose. The couplings are attached to the hose by a pressed clamp and they are not removable. Couplings B, C and D have swivel nuts, so please measure from the center of the cone.

HYDRAULIC HOSE LENGTH
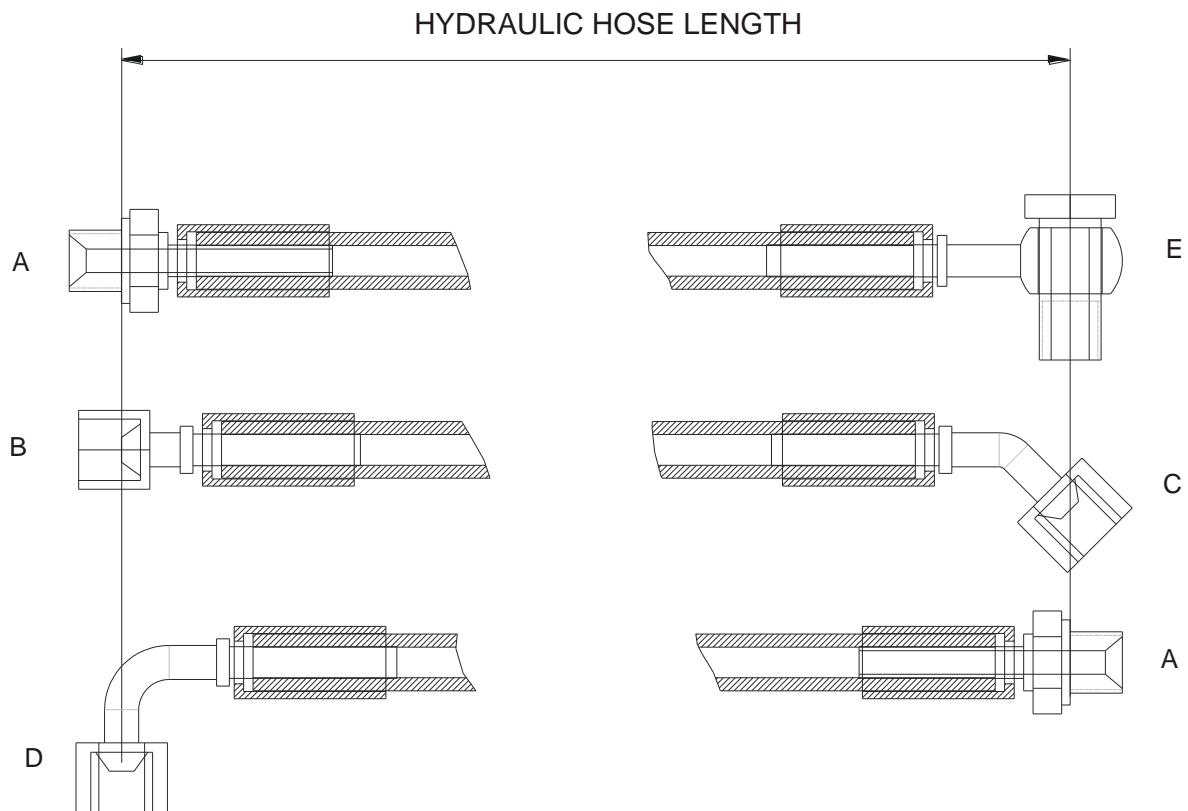
A =   HYDR. COUPLING MALE 0°

B =   HYDR. COUPLING NUT 0°

C =   HYDR. COUPLING NUT 45°

D =   HYDR. COUPLING NUT 90°

E =   BANJO COUPLING

3 Hose length calculation

3.1 Hose length hydraulic outhaul

3.1.1 Hose length between outhaul-cylinder and deck gland

BOOM	Y (mm)	HOSE ASSY	GLAND
200	450	540-880-15 HOSE 1/4" MLE1/4-MLE3/8	540-907 Ø100
250	460	540-880-06 HOSE 3/8" 3/8(MLE-MLE)	540-906 Ø110
290/300	210	540-880-06 HOSE 3/8" 3/8(MLE-MLE)	540-906 Ø110

MAST	H+T (mm)
F246	51+33=84
F265, 285, 305	61+44=105
R324, 370	55+20=75

XBF　　　　boom-bracket position from mast specification

Y, (H+T)　　from tables above

Z　　　　empiric value. To determinate Z, position gland in relation to mast center, according to customers sketch. See paper form 595-169-E/S filled in by customer.

C　　　　difference between T-base level and deck level, if there is any. See paper form 595-169-E/S. (C is not shown in the sketch below)

Hose length = XBF + Y + Z + (H+T) + C
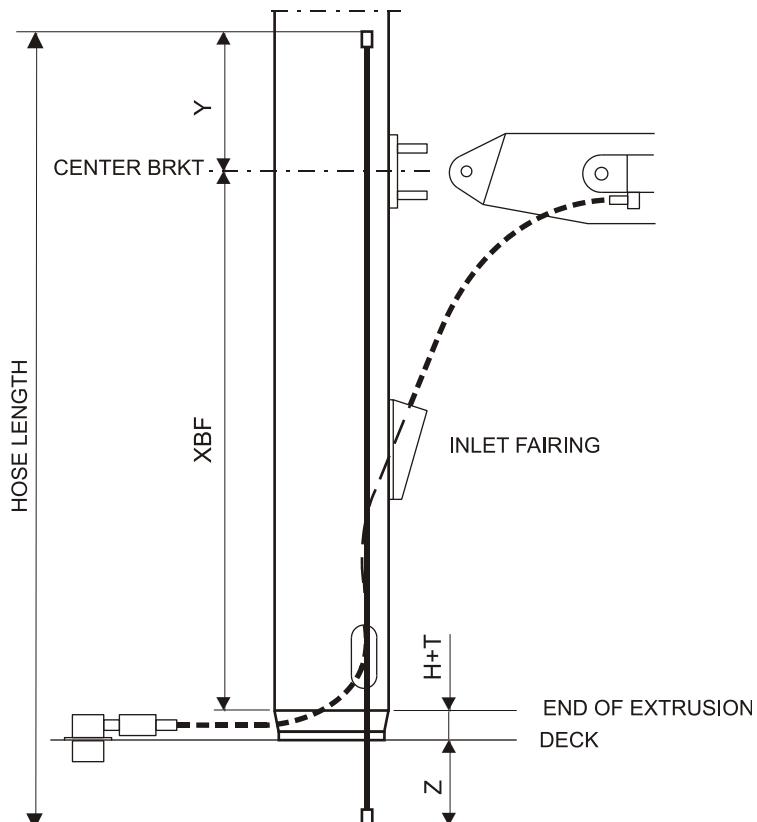
3.1.2 Hose length between outhaul-cylinder and mast gland

		BRACKET-GEAR 1)	GEAR-MASTGLAND 2)	HOSE LENGTH		
				200-BOOM 540-880-15 HOSE 1/4" (MLE1/4-MLE3/8) (mm)	250-BOOM 540-880-06 HOSE.3/8" 3/8(MLE-MLE) (mm)	**290**/300-BOOM HOSE 540-880-06 HOSE 3/8" 3/8(MLE-MLE) (mm)
HYDRAULIC FURLIN	F246 RB	300	280	870	890	-----
	F265, 286, 305 RB	350	280	920	940	-----
	F265, 286, 305 RC	340	280	910	930	-----
	F305 RD R324 RC, RD	600	280	1170	1190	940
	R370 RD	600	280	-----	1190	940
	F406 RD	565	333	-----	-----	958
ELECTR.F URLIN	F246 RB	210	550	1050	1070	940
	F265, 286, 305 RB RC	260	550	1100	1120	-----
	F305 RD	510	550	1350	1370	-----
	R324 RC,RD	510	550	1350	1370	1230

1) HY; Center bracket – center gear   EL; Center bracket – upper screw
2) HY; Center gear – gland screw   EL; Upper screw – gland screw

HYDRAULIC
DRIVE-UNIT

ELECTRICAL
DRIVE-UNIT
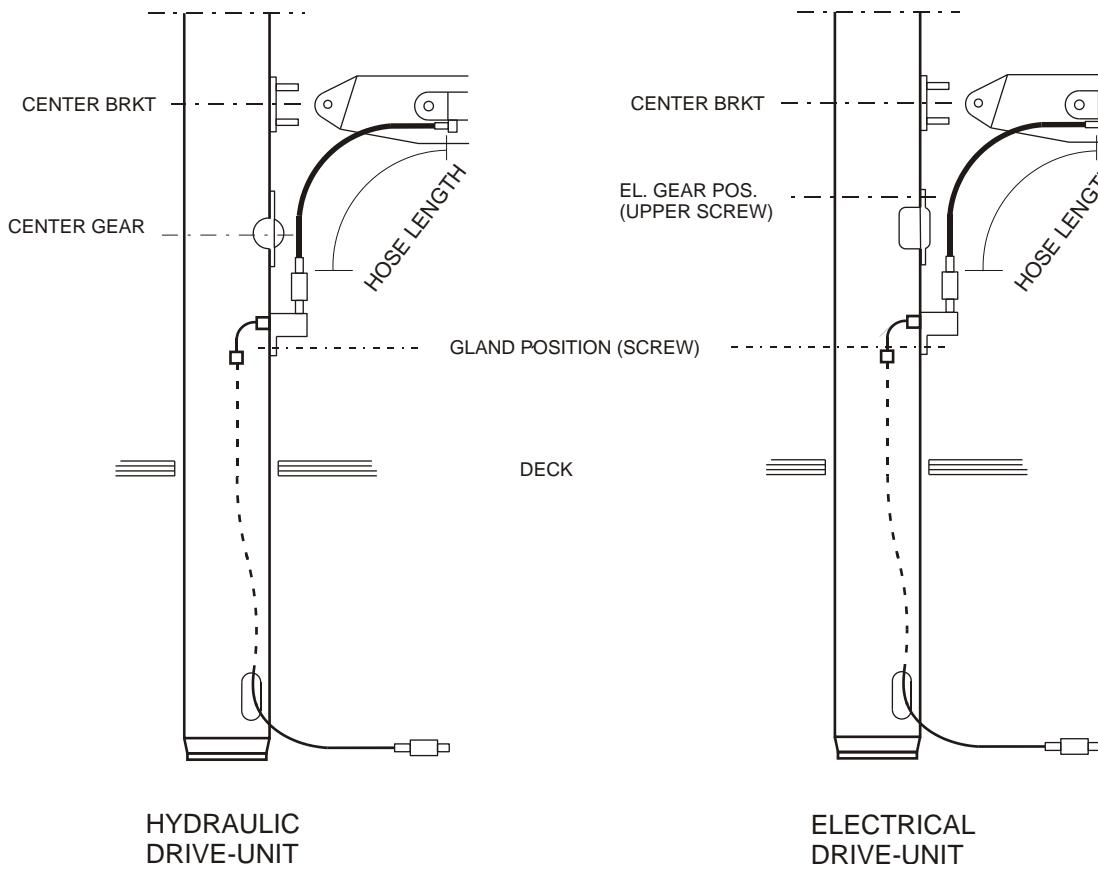
3.1.3 Hose length between mast gland and keel-end, hydraulic outhaul

HOSE ASSY: 540-880-20 HDR.HOSE 3/8"(NUT90/MALE) ST

1) HY; Center bracket – center gear
   EL; Center bracket – upper screw

2) HY; Center gear – gland screw
   EL; Upper screw – gland screw

		BRACKET- GEAR 1)	GEAR- MASTGLAND 2)	Y (mm)
HYDRAULIC FURLIN	F246 RB	300	280	580
	F265, 286, 305 RB	350	280	630
	F265, 286, 305 RC	340	280	620
	F305 RD R324 RC, RD			
	R370 RD	600	280	880
	F406	565	300	865
ELECTR.F URLIN	F246 RB	210	550	970
	F265, 286, 305 RB RC	260	550	990
	F305 RD R324 RC,RD	510	550	990

XBF   boom-bracket position from mast specification

Y   from table above

33   correction, see sketch

50   reduction for bending radius

200   standard over-length, or other specified by customer. See paper form 595-170-E/S.

We get   hose length= XBF – Y + 33 – 50 + 200 or specif.
or approximately;

Hose length = XBF – Y + 200 or specif.

**(Gaiter position on hose,
see next page)**
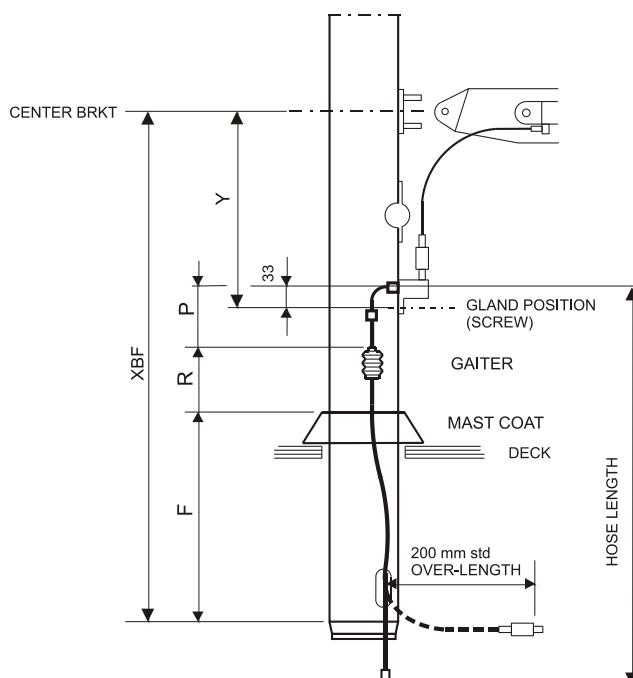
3.1.4 Gaiter position for hydraulic outhaul

HOSE ASSY 540-880-20
See sketch on previous page.

XBF   boom-bracket position from mast specification

Y   from table above (previous page)

33   correction, see sketch

F   top of mast coat, from mast specification

R   fixed distance between top of coat and top of gaiter
F246-305   R=160
R324-370   R=125

P   Gaiter position, also see drw PS581 (file H060/A4)

We get

P = XBF – F – R - Y + 33

3.2 Hose length hydraulic In-mast furling

3.2.1 Hose length between hydraulic drive-unit and deck gland

HOSE ASSY: 540-880-54 HDR HOSE 1/4"(NUT-45°/F-MLE Q) ST
DECKGLAND ASSY: 540-889-01

MAST	H+T (mm)
F246	51+33=84
F265, 285, 305	61+44=105
R324, 370	55+20=75

G   center gear position from mast specification

20   empiric value from center gear to straight hose

Z   empiric value. To determinate Z, position gland in relation to mast center, according to customers sketch. See paper form 595-171-E/S filled in by customer.

H+T   from table above

C   difference between T-base level and deck level, if there is any. See paper form 595-171-E/S. (C is not shown in the sketch below

**Hose length = G -20 + Z + (H+T) + C**

CENTER BRKT

20

CENTER GEAR

G

HOSE LENGTH

H+T

END OF EXTRUSION

DECK

Z
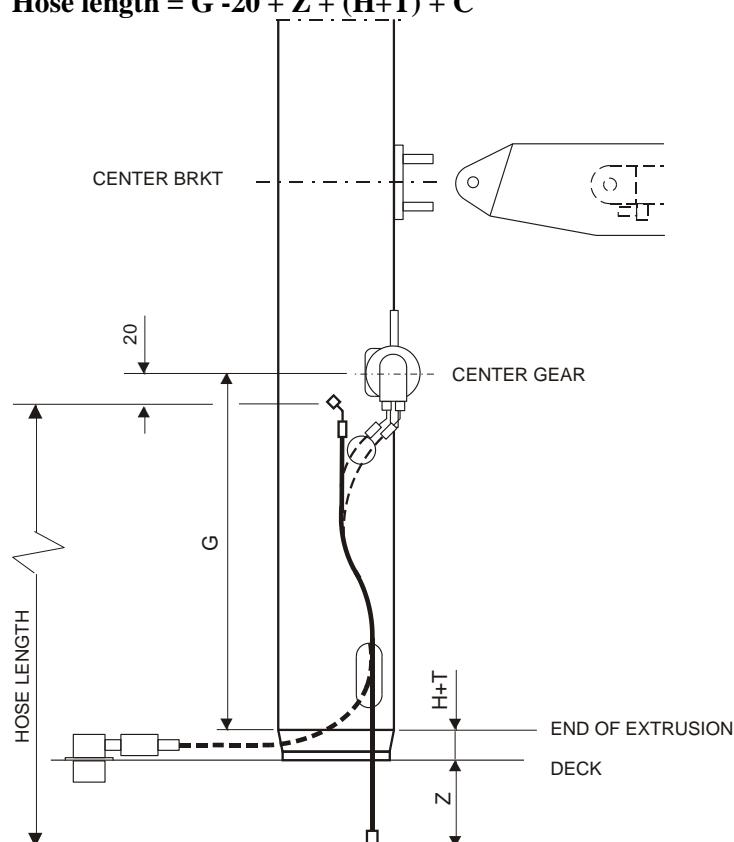
3.2.2 Hose length between hydraulic drive-unit and mast gland

HOSE ASSY: 540-880-11   HDR.HOSE 1/4"(NUT 0/NUT45) ST
Hose length = 400 mm
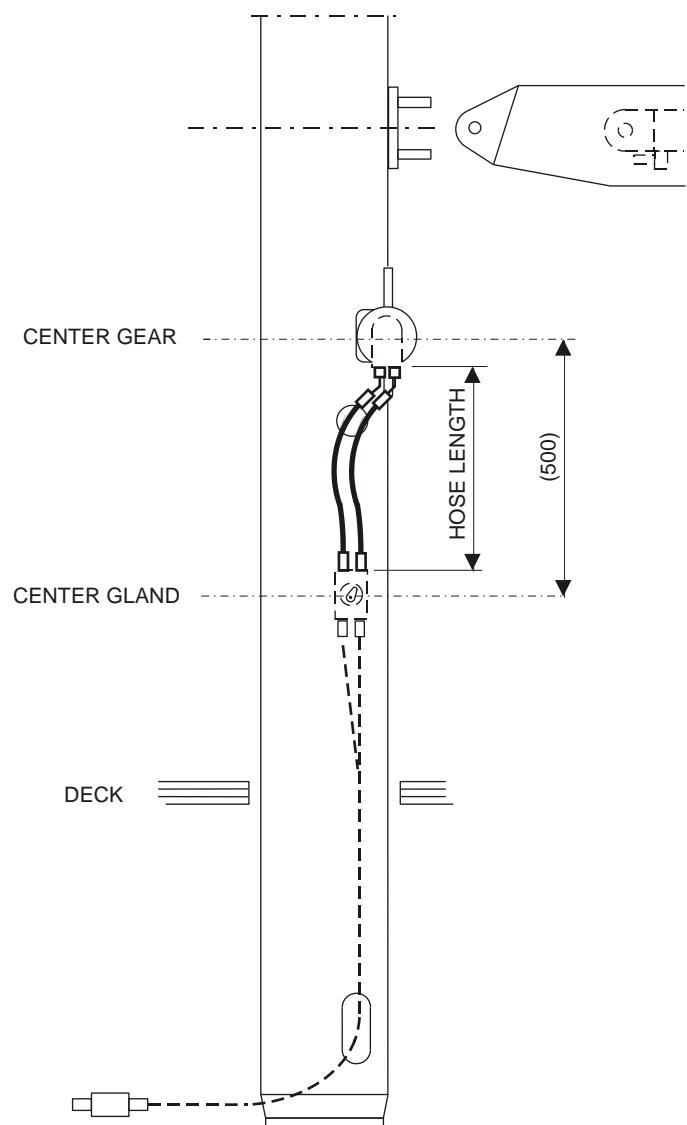
3.2.3 Hose length between mast gland and keel-end, in-mast furling

HOSE ASSY: 540-880-65 HDR.HOSE 3/8"(MLE/NUT0°)

G   center gear position from mast specification

500   center mast gland, see sketch

55   correction, see sketch

50   reduction for bending radius

200   standard over-length, or other specified by customer.
                    See paper form 595-172-E/S.

We get   hose length =G - 500 - 55 – 50 + 200 or specified

or approximately

Hose length = G – 600 + 200 or specified

(Gaiter position on hose, see next page)
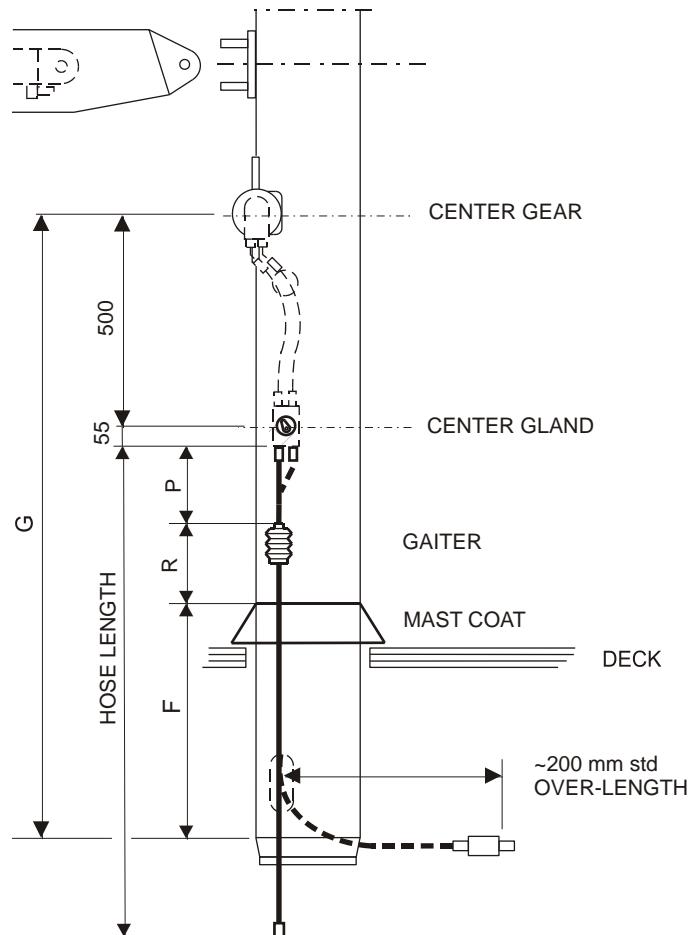
3.2.4 Gaiter position for in-mast furling

HOSE ASSY 540-880-65
See sketch on previous page.

G   center gear position from mast specification

500   center mast gland, see sketch

55   correction, see sketch

F   top of mast coat, from mast specification

R   fixed distance between top of coat and top of gaiter
                  F246-305   R=160
                  R324-370   R=125
                  F406   R=130

P   Gaiter position, also see drw PS581 (file H060/A4)

We get $P = G - 500 - 55 - R - F$


P = G – F – R - 555

MINIMUM REQUIRED BOOM HEIGHT for this application is found in MB 50:5.

## 3.3 How to determine "Z" on deck stepped mast

Z is used in the formula when calculating the length of
hydraulic hoses for deck stepped masts. Both for hydraulic
outhaul and for in-mast furling.

The jig used to determine the length Z, consists of
a mounting board, a mast extrusion with an attached
hose and a "deck gland".

Fix the mast at the position for right mast size.
Put the deck gland in the right position, according to the inquire
forms filled in by the customer and fix it with the screw.
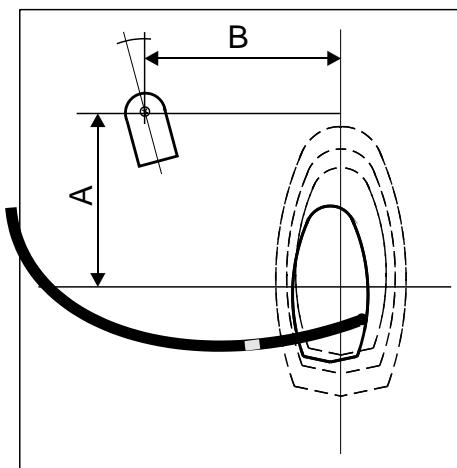
1. Apply the hose in a smooth bend to reach the
    deck gland. Note the minimum bending radius.
2. Mark out the point on the hose shown by the
    arrow in the picture.
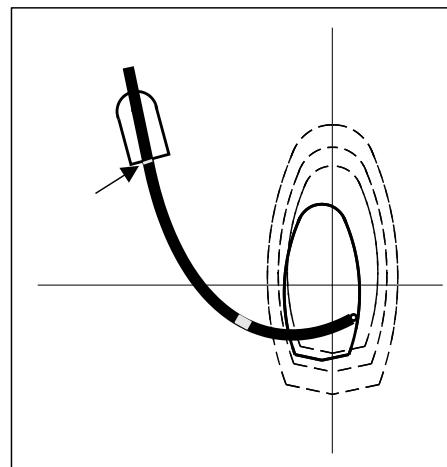
3. "Z" is the distance between permanent tapemark
    and the point at the arrow.
    (tape is marking end of extrusion, see picture)
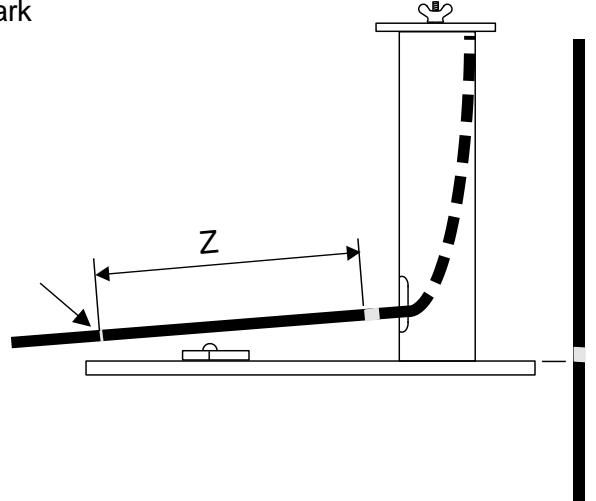
3.4   Hose length hydraulic halyard tensioner

3.4.1   Hose length between hydraulic halyard tensioner and keel-end

100   hose length between bracket position and cylinder
BR   bracket position, from mast specification
200   standard hose overlength at keel end
H   Hose length

H = BR + 100 + 200

3.4.2 Gaiter position hydraulic halyard tensioner

F top of mast coat, from mast specification
R F246-305   => R=160
R324-370   => R=125
F406   => R=130

Gaiter position from top end of hose = H -200 -F -R
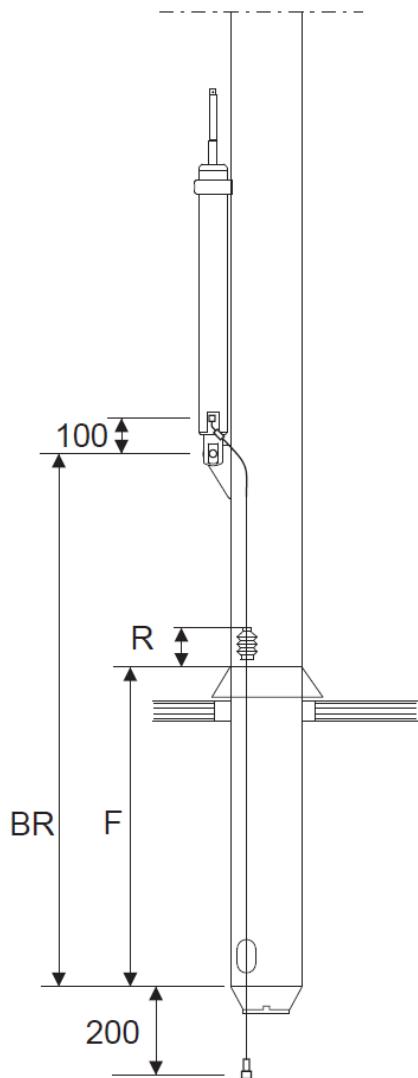
3.5 Hose length hydraulic boom vang

3.5.1 Hose length between hydraulic boom vang and keel-end

700	hose length centre of kicker bracket - pressure port on fork: HV44/HV57
750	hose length centre of kicker bracket - pressure port on fork: HV89
KB	centre of kicker bracket, from mast specification
200	standard hose overlength at keel end
H	Hose Length

HV 44/57   **H = 700 + KB + 200**
HV89   **H = 750 + KB + 200**

3.5.2 Gaiter position

F top of mast coat, from mast specification
R F246-305   => R=160
R324-370   => R=125
F406   => R=130

Gaiter position from top end of hose = H -200 -F -R
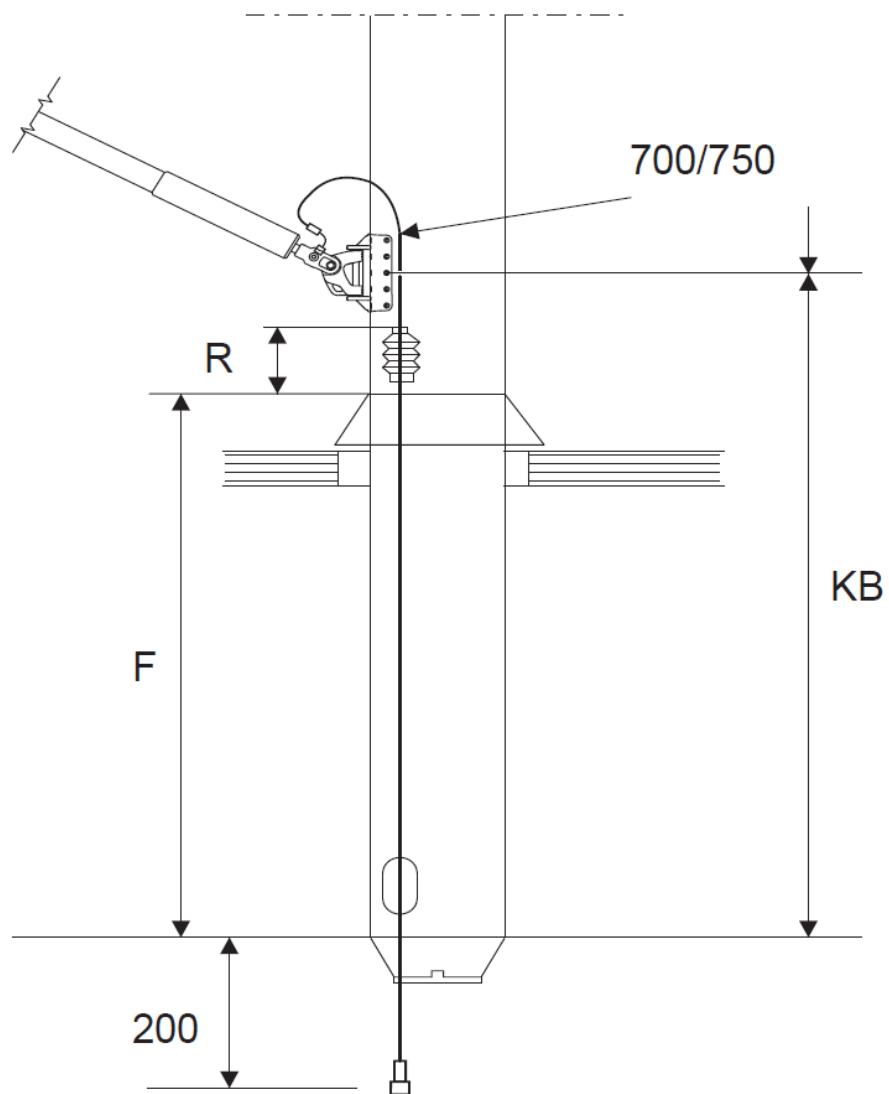
3.6 Hose length Leisure-Furl boom

3.6.1 Hose length between boom and mast gland, Leisure-furl

Boom	Hose assy	Hose length (mm)	Note
18-6/H		1020	?
20-7/H	540-880-18	1020	3/8 JIC9/16 NUT0°/M
25-8/H		1020	?

BRACKET POSITION
(LOWER SURFACE
UPPER CONSOLE)

300

GLAND POSITION =
=CENTER CUT
(GLAND 550-271)

HOSE LENGTH

GAITER

MAST COAT

DECK
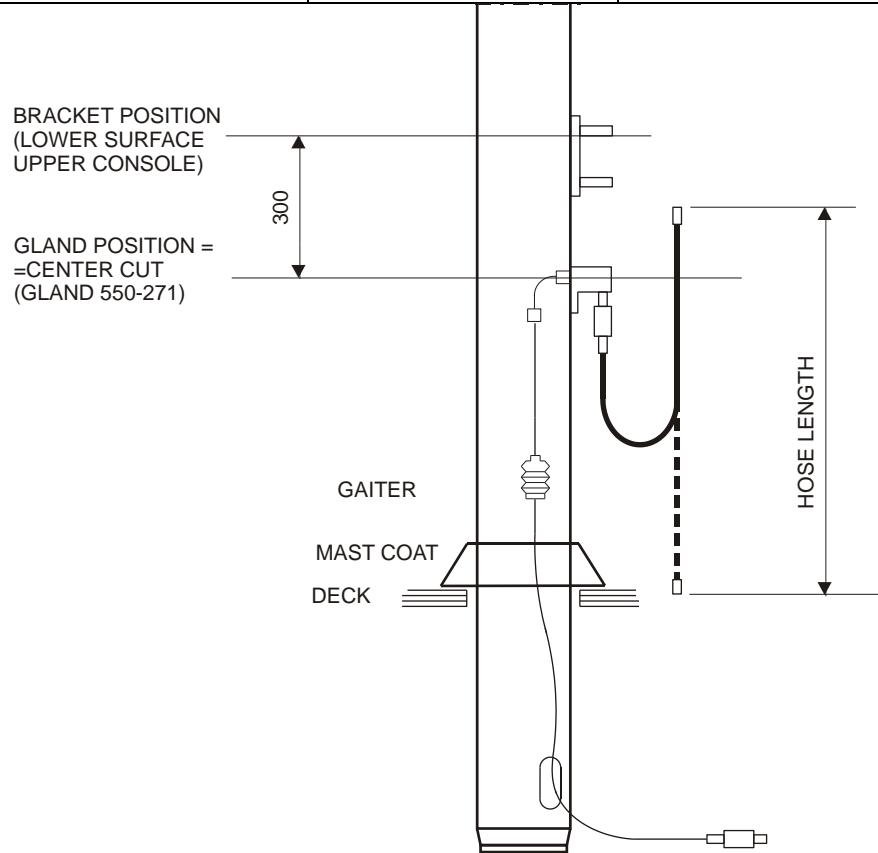
3.6.2 Hose length between mast gland and keel-end, Leisure-furl

HOSE ASSY: 540-880-20 HDR.HOSE 3/8"(NUT90/MALE)ST

XBF   boom-bracket position from mast specification

300   distance bracket – gland

50   reduction for bending radius

200   standard over-length, or other specified by customer. See paper form XXXXXXXX.

We get   hose length= XBF –300 – 50 + 200 or specif.

Hose length = XBF – 350 + 200 or specif.

(Gaiter position on hose, see next page)

BRACKET POSITION
(LOWER SURFACE
UPPER CONSOLE)

300

GLAND POSITION =
=CENTER CUT
(GLAND 550-271)

XBF

P

R

GAITER

MAST COAT

DECK

F

HOSE LENGTH

200 mm std
OVER-LENGTH
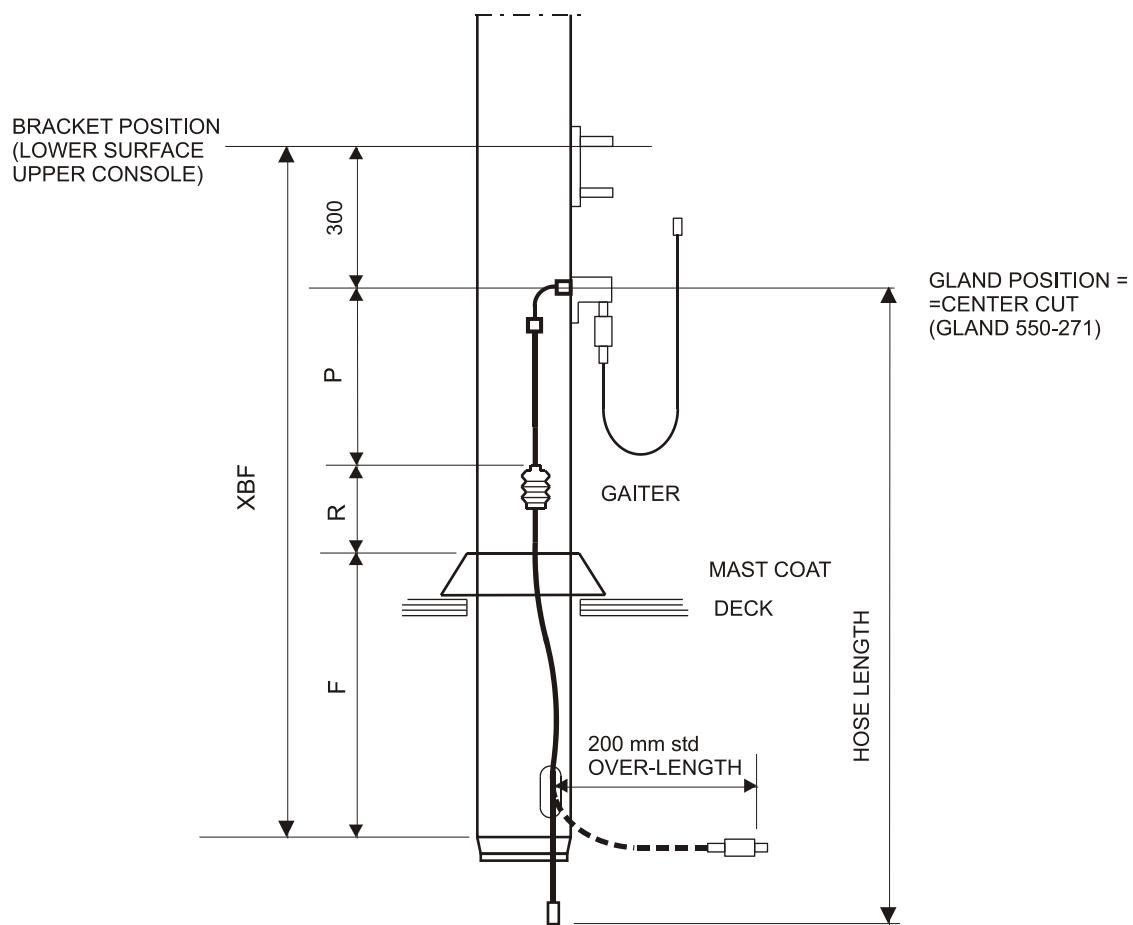
3.7   Gaiter position for Leisure-furl

HOSE ASSY 540-880-20
See sketch on previous page.

XBF	boom-bracket position from mast specification
300	distance bracket – gland
F	top of mast coat, from mast specification
R	fixed distance between top of coat and top of gaiter C245-304 R=190 E321-365 R=125
P	Gaiter position, also see drw PS581 (file H060/A4)

We get

P = XBF – F – R - 300

SELDÉN

www.seldenmast.com