



APEX DYNAMICS, INC.

SMART LUBRICATION SYSTEM

Technical Instruction

Original Instruction



Lubrication System

Main Features

CE & ATEX Certification

Support up to 40 Lubrication Positions

Lubrication Frequency Adjustable

Hand-Set and PLC Control Mode

Memory Function

Fill Level Monitoring and Electrical Self-Protection



LUG 400



LUG 2000

Order Code of Lutricator

LUG - 411 / 412 / 422 / 423 / 424

No. of Outlet	No. of Pump	No. of Lubrication Position
LUG-411 : 1	LUG-411 : 1	LUG-411 : max.4 ⁽¹⁾ /14 ⁽²⁾
LUG-412 : 2	LUG-412 : 1	LUG-412 : max.8 ⁽¹⁾ /28 ⁽²⁾
LUG-422 : 2 (1+1)	LUG-422 : 2	LUG-422 : max.8 ⁽¹⁾ /28 ⁽²⁾
LUG-423 : 3 (1+2)	LUG-423 : 2	LUG-423 : max.12 ⁽¹⁾ /42 ⁽²⁾
LUG-424 : 4 (2+2)	LUG-424 : 2	LUG-424 : max.16 ⁽¹⁾ /56 ⁽²⁾

(1) Requiring use of a Distributor

(2) Requiring use of a Progressive Flow Distributor

LUG - 2102 / 2204 / 2306 / 2408 / 2510

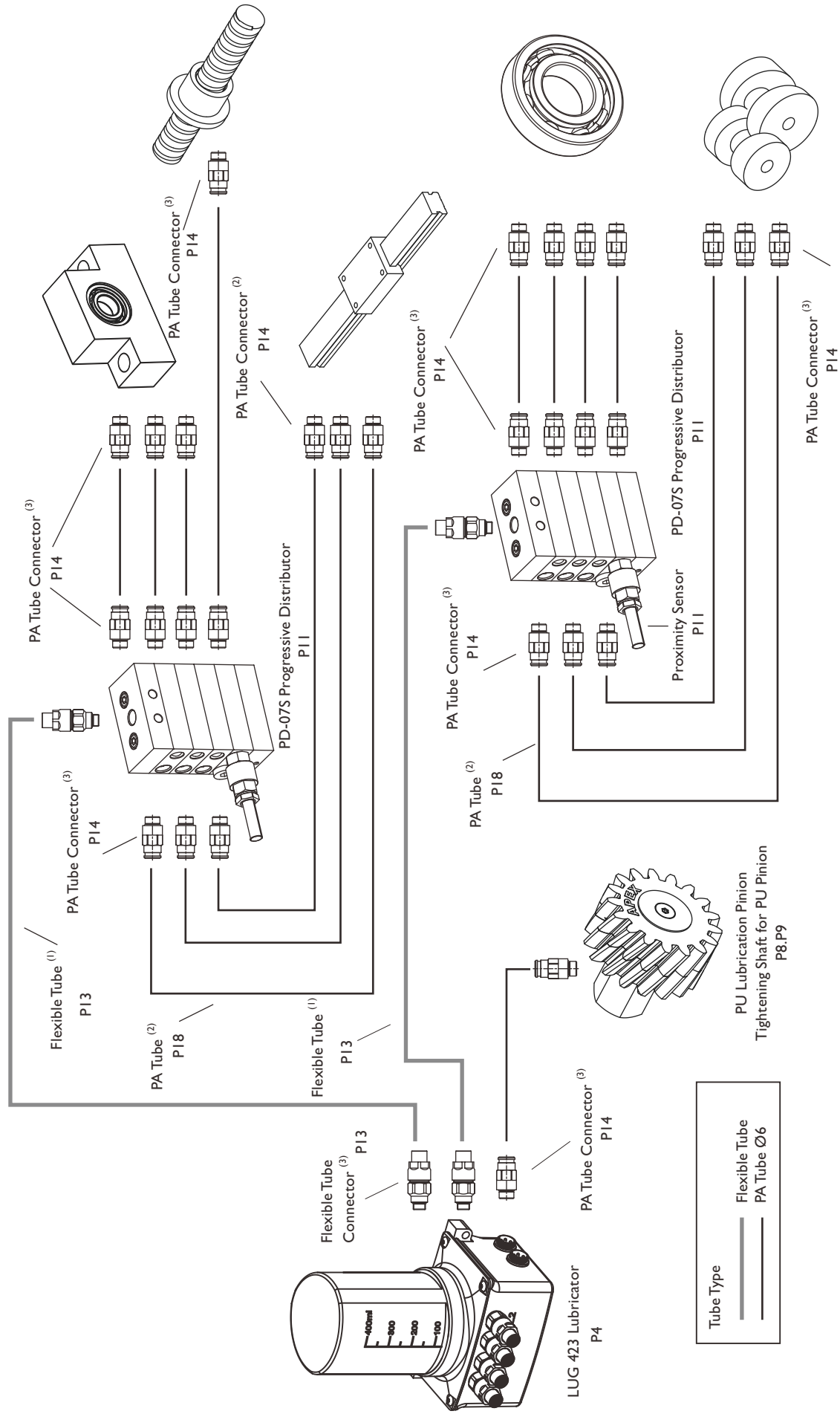
No. of Outlet	No. of Pump	No. of Lubrication Position
LUG-2102 : 2	LUG-2102 : 1	LUG-2102 : max. 8
LUG-2204 : 4	LUG-2204 : 2	LUG-2204 : max. 16
LUG-2306 : 6	LUG-2306 : 3	LUG-2306 : max. 24
LUG-2408 : 8	LUG-2408 : 4	LUG-2408 : max. 32
LUG-2510 : 10	LUG-2510 : 5	LUG-2510 : max. 40



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Lubrication System Example of Application



- (1) Using in the main tube of lubricator, the total length of 5m (inclusive) recommended PA tube, total length > 5m recommend a flexible tube.
- (2) Using a dispenser of the PA tube is suitable ø4, ø6 PA tube. When the total length of PA tube < 1m and recommended ø4 PA tube, when the total length > 1m and recommended ø6 PA tube.
- (3) Both provide in-line connector option and right-angle connector for flexible tube and PA tube.

Performance - LUG 400

Technical Specification	
Dimension (Width x Height x Depth)	167mm x 196mm x 94mm
Weight (No lubricant)	1780g
Volume of Lubricant	400 cm ³
Lubricant Type	Grease NLGI 1~3
Pump	Piston Pump
Operating Pressure	Max. 70 bar (1,000 psi)
Delivery Volume Per Pulse/Stroke	0.15 cm ³
No. of Outlet	Max. 4 Connectors ⁽¹⁾
No. of Lubrication Position	Max. 16 ⁽²⁾ / 56 ⁽³⁾
Outlet Connection	PA Tube
Operation Voltage	24V DC
Current Consumption	$I_{max} \leq 500$ mA
Connecting Plug	M16 x 1 , 5-PIN
IP Class	IP 65
Operating Temperature	-25°C ~ 70°C
Control	PLC , Hand-Set Controller ⁽⁴⁾
Pressure Monitoring	System Pressure Measurement
Oil Fill Monitoring	Reed Switch

Lubricator

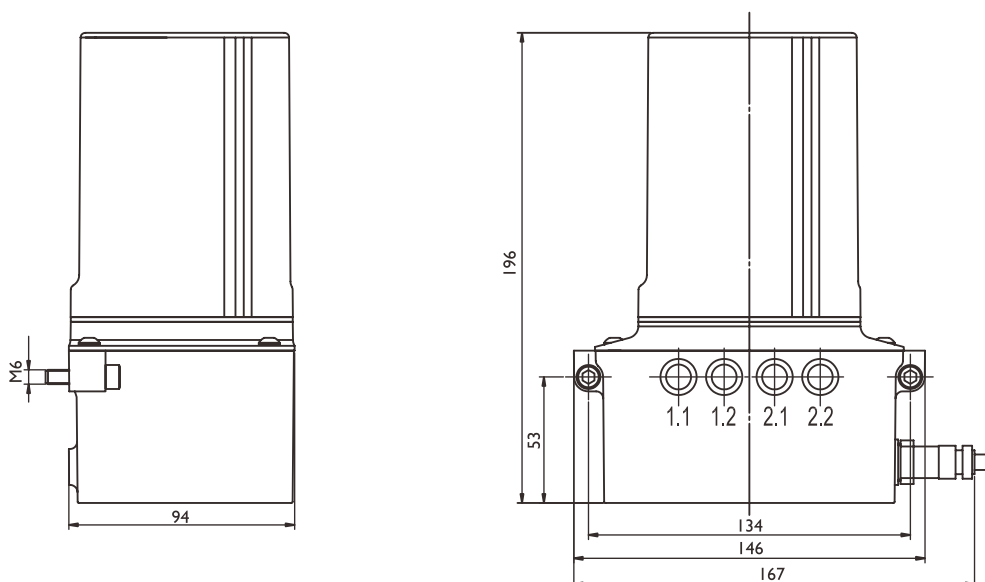
No. of Outlet	No. of Pump	No. of Lubrication Position	Order Code
1	1	max. 4 ⁽²⁾ / 14 ⁽³⁾	LUG-411
2	1	max. 8 ⁽²⁾ / 28 ⁽³⁾	LUG-412
2 (1+1)	2	max. 8 ⁽²⁾ / 28 ⁽³⁾	LUG-422
3 (1+2)	2	max. 12 ⁽²⁾ / 42 ⁽³⁾	LUG-423
4 (2+2)	2	max. 16 ⁽²⁾ / 56 ⁽³⁾	LUG-424

(1) Connector Dimension M10

(2) Requiring use of a Distributor

(3) Requiring use of a Progressive Flow Distributor

(4) Hand-Set is not included in lubricator and is to order separately



Performance - LUG 2000

Technical Specification

Dimension (Width x Height x Depth)	197mm x 268.5mm x 175mm
Weight (No lubricant)	4000g
Volume of Lubricant	2000 cm ³
Lubricant Type	Oil
Pump	Piston Pump
Viscosity	min. 60 cst
Operating Pressure	Max. 70 bar (1,000 psi)
Delivery Volume Per Pulse/Stroke	0.15 cm ³
No. of Outlet	Max. 10 (In-Line Connectors) ⁽¹⁾
No. of Lubrication Position	Max. 40 ⁽²⁾
Outlet Connection	PA Tube
Operation Voltage	24V DC
Current Consumption	$I_{max} \leq 500$ mA
Connecting Plug	M16 x 1 , 5-PIN
IP Class	IP 65
Operating Temperature	-25°C ~ 70°C
Control	PLC , Hand-Set Controller ⁽³⁾
Pressure Monitoring	System Pressure Measurement
Oil Fill Monitoring	Reed Switch

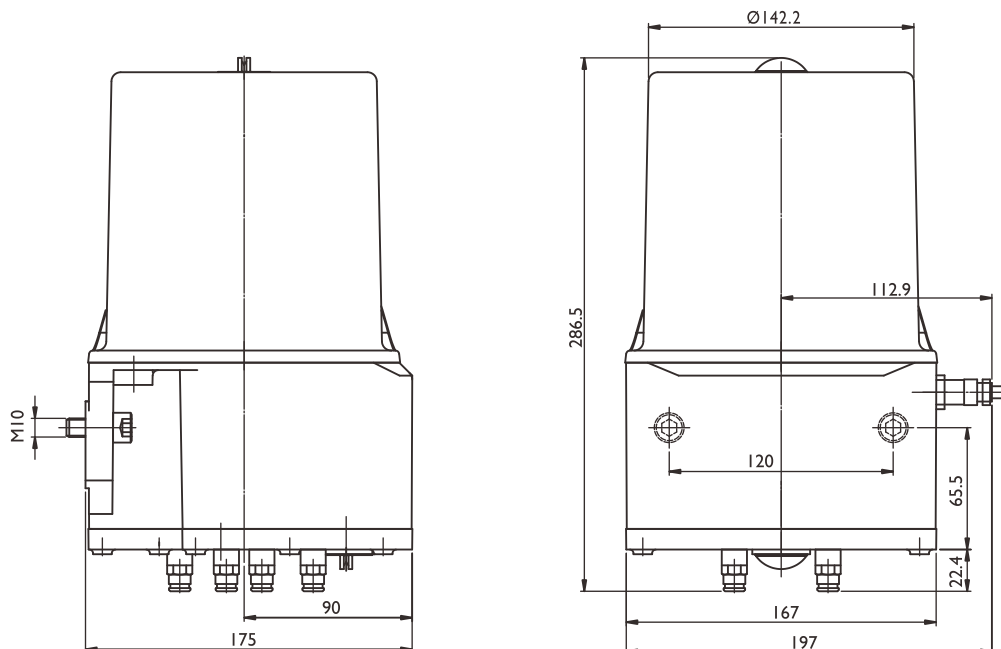
Lubricator

No. of Outlet	No. of Pump	No. of Lubricaion Position ⁽²⁾	Order Code
2	1	max. 8	LUG-2102
4	2	max. 16	LUG-2204
6	3	max. 24	LUG-2306
8	4	max. 32	LUG-2408
10	5	max. 40	LUG-2510

(1) Connector Dimension M10

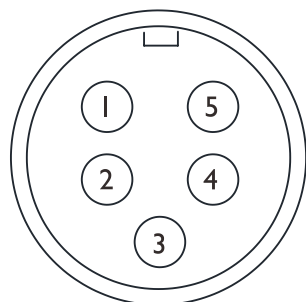
(2) Requiring use of a Distributor

(3) Hand-Set is not included in lubricator and is to order separately



Power System

- 24V DC is applied to the Lubricator. Any electrical interference during power connection should be avoided.



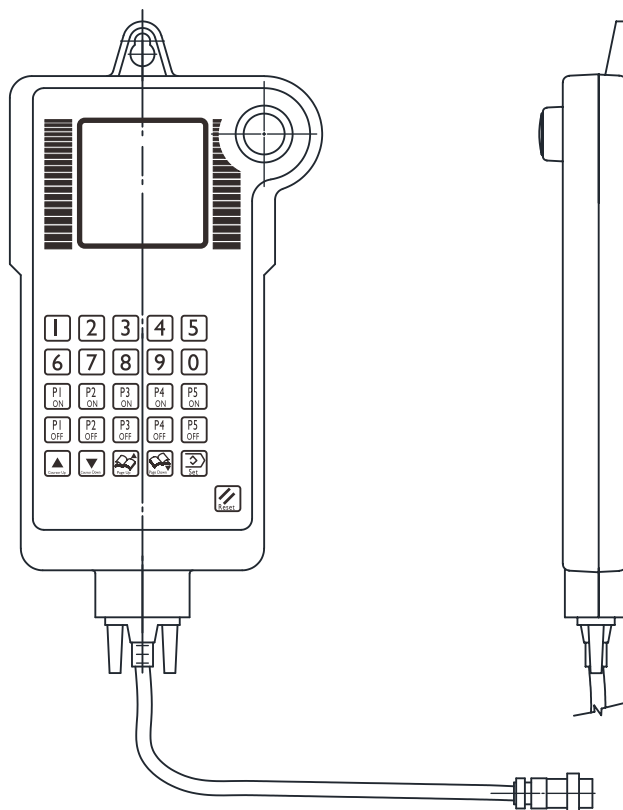
5-Pin Socket

The connection between lubricator and controller via 5-Pin Socket.

PIN 1 : Output Signal
 PIN 2 : Input Signal
 PIN 3 : FGND
 PIN 4 : Input 24V DC
 PIN 5 : GND

- Hand-Set Controller (Order Code : EC01)

After set-up of lubricator, the Hand-Set Controller can be removed.
 Please also refer to Manual of Installation.



Lubrication of Rack & Pinion

- As transmission devices, Rack and Pinion are often exposed to air and may oxidized. It's highly recommended to use APEX PU Lubrication Pinion to perform greasing and uniform distribution of lubricant on all teeth surfaces.
- Open-Cell Polyurethane Foam of PU Lubrication Pinion can absorb a certain amount of lubricant. Standard Involute Teeth Design can fit perfectly the teeth of Rack and Pinion without any loading by lubrication. Under long-time operation condition, PU Lubrication Pinion provides an automatic lubrication process on transmission devices to reduce wearing, but no overlubrication.
- First soak PU Lubrication Pinion in lubricant to allow an immediate application. The Feeding Rate of lubricant depends on Module No. and Speed, can be adjusted by controller.

Please also refer to Table I below showing Lubricant Volume vs. Module No..

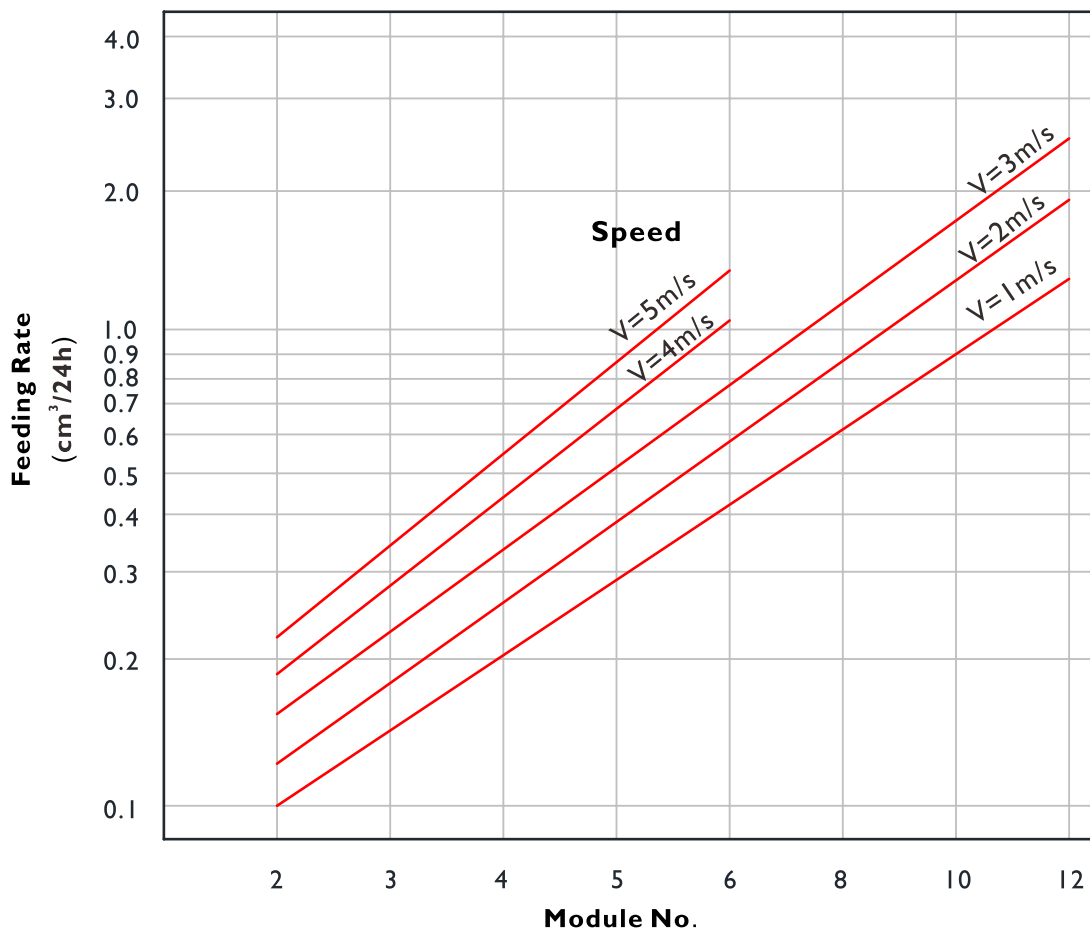
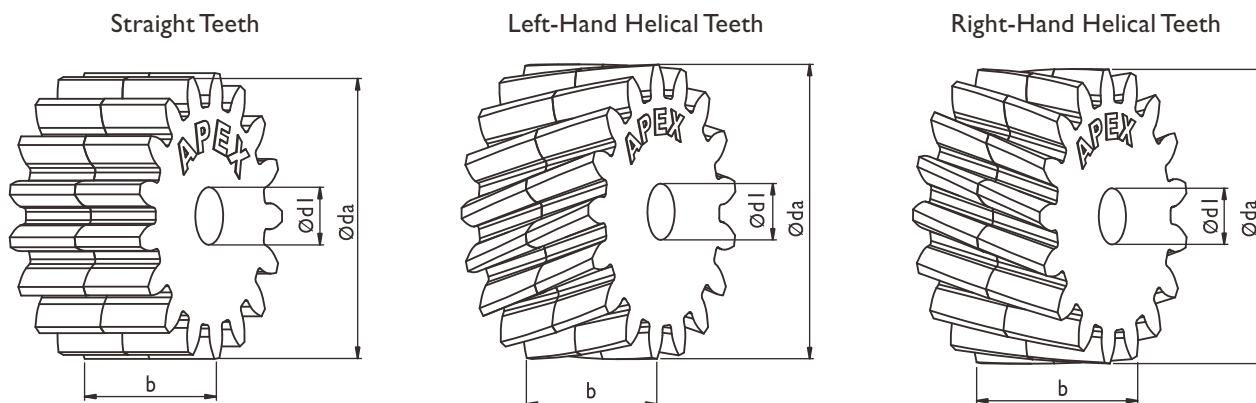


Table I

PU Lubrication Pinion

Effective Lubrication can be achieved through the use of APEX Lubrication System especially for Rack and Pinion. For uniform distribution of lubricant over rack surface, it's recommend to use a driving Pinion to allow evenly greasing.

● Lubrication Pinion



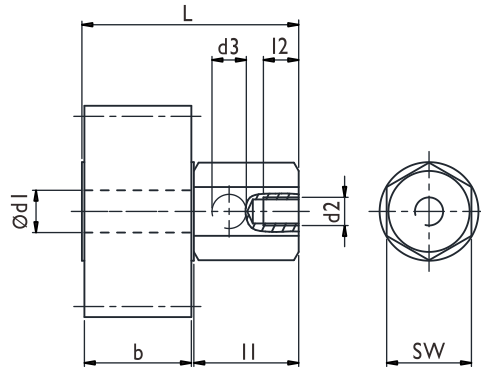
Module No.	Z ⁽¹⁾	Application	da ⁽²⁾	dF ⁽³⁾	dI	b	Order Code	Central Height a
1	36	Straight Teeth	38	36	12	15	PU-01-36S	$a = \frac{d + dF}{2} \text{ (4)}$ $A = h_0 + \frac{dF}{2} \text{ (5)}$
		Rack (Left-Hand Helical)	40.2	38.2			PU-01-36L	
		Pinion (Right-Hand Helical)	40.2	38.2			PU-01-36R	
1.5	24	Straight Teeth	39	36	12	20	PU-1J-24S	
		Rack (Left-Hand Helical)	41.2	38.2			PU-1J-24L	
		Pinion (Right-Hand Helical)	41.2	38.2			PU-1J-24R	
2	17	Straight Teeth	38	34	12	25	PU-02-17S	
		Rack (Left-Hand Helical)	40.1	36.1			PU-02-17L	
		Pinion (Right-Hand Helical)	40.1	36.1			PU-02-17R	
2.5	17	Straight Teeth	47.5	42.5	12	25	PU-2J-17S	
		Rack (Left-Hand Helical)	50.1	45.1			PU-2J-17L	
		Pinion (Right-Hand Helical)	50.1	45.1			PU-2J-17R	
3	17	Straight Teeth	57	51	12	30	PU-03-17S	
		Rack (Left-Hand Helical)	60.1	54.1			PU-03-17L	
		Pinion (Right-Hand Helical)	60.1	54.1			PU-03-17R	
4	17	Straight Teeth	76	68	12	40	PU-04-17S	
		Rack (Left-Hand Helical)	80.2	72.2			PU-04-17L	
		Pinion (Right-Hand Helical)	80.2	72.2			PU-04-17R	
5	17	Straight Teeth	95	85	20	50	PU-05-17S	
		Rack (Left-Hand Helical)	100.2	90.2			PU-05-17L	
		Pinion (Right-Hand Helical)	100.2	90.2			PU-05-17R	
6	17	Straight Teeth	114	102	20	60	PU-06-17S	
		Rack (Left-Hand Helical)	120.2	108.2			PU-06-17L	
		Pinion (Right-Hand Helical)	120.2	108.2			PU-06-17R	
8	17	Straight Teeth	152	136	20	80	PU-08-17S	
		Rack (Left-Hand Helical)	160.3	144.3			PU-08-17L	
		Pinion (Right-Hand Helical)	160.3	144.3			PU-08-17R	
10	17	Straight Teeth	190	170	20	100	PU-10-17S	
		Rack (Left-Hand Helical)	200.4	180.4			PU-10-17L	
		Pinion (Right-Hand Helical)	200.4	180.4			PU-10-17R	
12	14	Straight Teeth	192	168	25	120	PU-12-14S	
		Rack (Left-Hand Helical)	202.3	178.3			PU-12-14L	
		Pinion (Right-Hand Helical)	202.3	178.3			PU-12-14R	
1.591 (Pt 5)	24	Straight Teeth	41.4	38.2	12	20	PU-1K-24S	
3.183 (Pt 10)	17	Straight Teeth	60.5	54.1	12	30	PU-3B-17S	
4.244 (Pt 13.33)	17	Straight Teeth	80.6	72.1	12	40	PU-4D-17S	

(1) No. of Teeth (2) Tip Diameter (3) Pitch Diameter (4) Central Distance between PU Pinion and Pinion (d = Pinion Pitch Diameter)

(5) Central Distance between PU Pinion and Rack Bottom (h₀ = Height between Rack's pitch line to bottom)

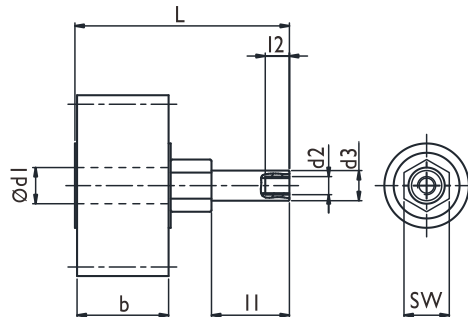
Tightening Shaft for PU Pinion

● Tightening Shaft (Right-Angle)



Module No.	L	l1	l2	b	d1	d2	Hole d3	SW	Order Code
1	46.4	30	10	15	12	M8	G 1/8"	24	AUX-01-1
1.5	51.4	30	10	20	12	M8	G 1/8"	24	AUX-1J-1
2	56.4	30	10	25	12	M8	G 1/8"	24	AUX-02-1
2.5	56.4	30	10	25	12	M8	G 1/8"	24	
3	61.4	30	10	30	12	M8	G 1/8"	24	AUX-03-1
4	71.4	30	10	40	12	M8	G 1/8"	24	AUX-04-1
5	81.4	30	10	50	20	M8	G 1/8"	24	AUX-05-1
6	91.4	30	10	60	20	M8	G 1/8"	24	AUX-06-1
8	111.4	30	10	80	20	M8	G 1/8"	24	AUX-08-1
10	131.4	30	10	100	20	M8	G 1/8"	24	AUX-10-1
12	152	30	10	120	25	M8	G 1/8"	30	AUX-12-1
1.591 (Pt 5)	51.4	30	10	20	12	M8	G 1/8"	24	AUX-1J-1
3.183 (Pt 10)	61.4	30	10	30	12	M8	G 1/8"	24	AUX-03-1
4.244 (Pt 13.33)	71.4	30	10	40	12	M8	G 1/8"	24	AUX-04-1

● Tightening Shaft (In-Line)

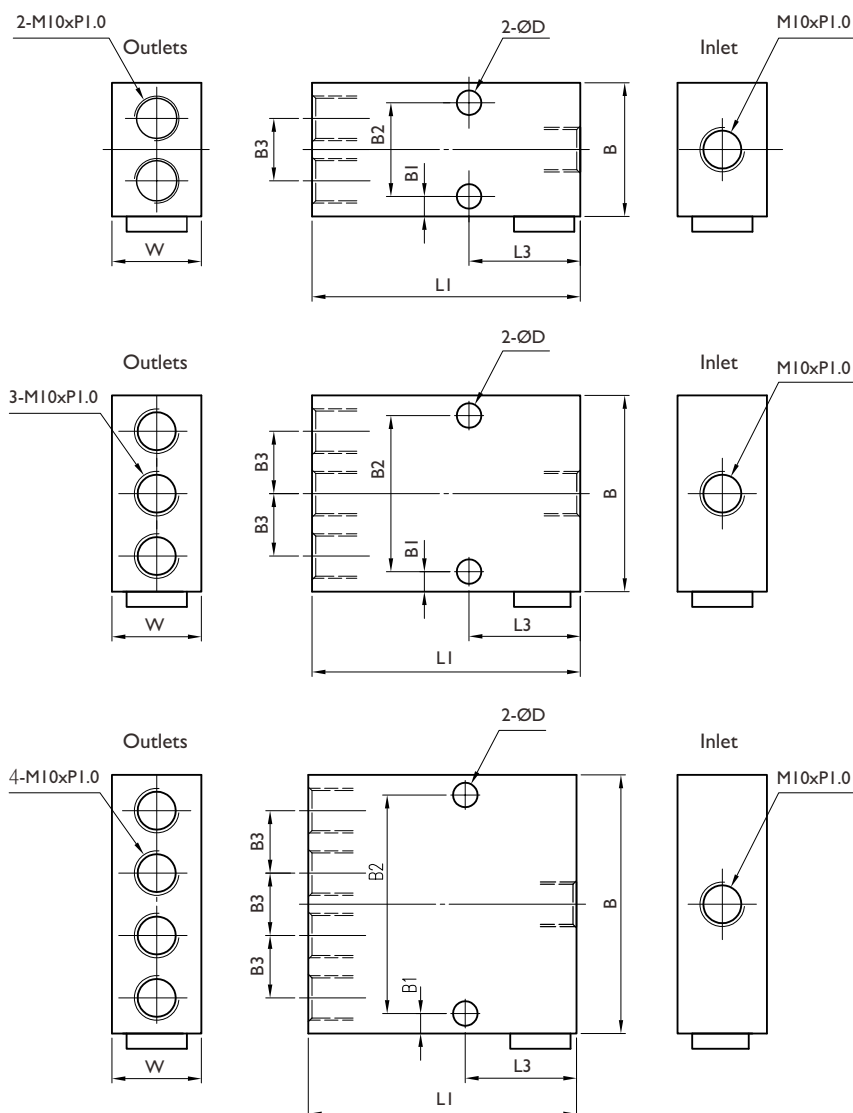


Module No.	L	l1	l2	b	d1	Hole d2	d3	SW	Order Code
1	56	30	12	15	12	M6	M10	17	AUX-01-2
1.5	61	30	12	20	12	M6	M10	17	AUX-1J-2
2	66	30	12	25	12	M6	M10	17	AUX-02-2
2.5	66	30	12	25	12	M6	M10	17	
3	71	30	12	30	12	M6	M10	17	AUX-03-2
4	81	30	12	40	12	M6	M10	17	AUX-04-2
5	116	49	12	50	20	G 1/8"	M16	24	AUX-05-2
6	126	49	12	60	20	G 1/8"	M16	24	AUX-06-2
8	146	49	12	80	20	G 1/8"	M16	24	AUX-08-2
10	166	49	12	100	20	G 1/8"	M16	24	AUX-10-2
12	186.6	49	12	120	25	G 1/8"	M16	30	AUX-12-2
1.591 (Pt 5)	61	30	12	20	12	M6	M10	17	AUX-1J-2
3.183 (Pt 10)	71	30	12	30	12	M6	M10	17	AUX-03-2
4.244 (Pt 13.33)	81	30	12	40	12	M6	M10	17	AUX-04-2

Distributor

Distributor supports up to 4 lubrication positions. Remark for operation:

- The distance between Distributor and Lubricator outlet should be kept as short as possible.
- Install only one distributor at outlet, do not connect distributors in series.
- The pressure difference between all lubrication outlets should not exceed 8 bar.
- To use PA tube with same cross-section and similar length.



No. of Inlet	No. of Outlet	LI	L3	B	B1	B2	B3	D	W	Order Code			
										Aluminum Alloy		Stainless	
										Grease	Oil	Grease	Oil
I	2	60	24.9	30	4.5	21	14	5.5	20	SPL-602	SPL-612	SPLS-602	SPLS-612
I	3	60	24.9	44	4.5	35	14	5.5	20	SPL-603	SPL-613	SPLS-603	SPLS-613
I	4	60	24.9	58	4.5	49	14	5.5	20	SPL-604	SPL-614	SPLS-604	SPLS-614
I	2	60	24.9	32	4.5	23	16	5.5	20	SPL-802	SPL-812	SPLS-802	SPLS-812
I	3	60	24.9	48	4.5	39	16	5.5	20	SPL-803	SPL-813	SPLS-803	SPLS-813
I	4	60	24.9	64	4.5	55	16	5.5	20	SPL-804	SPL-814	SPLS-804	SPLS-814

According to required diameter, choose connector.(E.g.: SPLS-8 series is to select for Pipe diameter 8 mm).

Supporting standard grease NLGI 2.

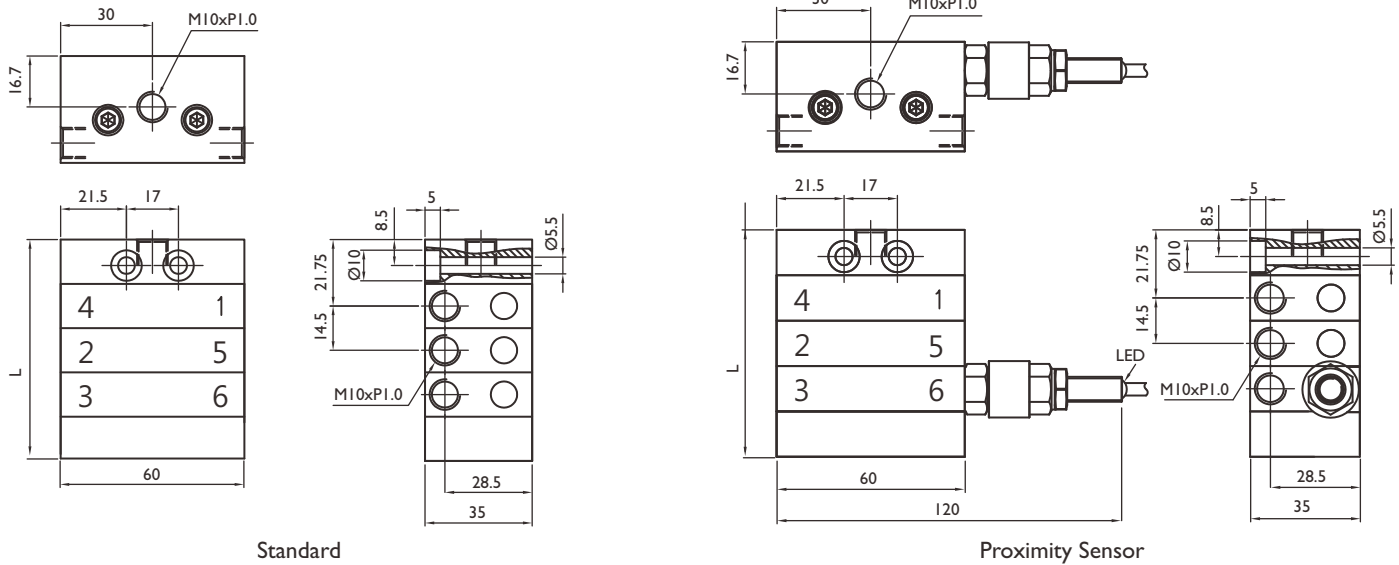
Temperature range +10°C~+60°C.

Pressure difference of outlets may result in different grease delivery volume.

Progressive Flow Distributor

Progressive flow distributor supports multiple lubrication positions successive in the pumping cycle. The output volume by each outlet is 0.15ml.

- Grease is to be apply.
- Supporting max 14 outlets
- Supporting Ø4 and Ø6 in-line and right-angle connector
- Max. permitted pressure 100 bar



No. of Outlet	Per Stroke (ml)	Number of time for each cycle	L	Order Code	
				Standard	w. Proximity Sensor
5	0.15	5	72.5	PD-05	PD-05S
6		6	72.5	PD-06	PD-06S
7		7	87	PD-07	PD-07S
8		8	87	PD-08	PD-08S
9		9	101.5	PD-09	PD-09S
10		10	101.5	PD-10	PD-10S
11		11	116	PD-11	PD-11S
12		12	116	PD-12	PD-12S
13		13	130.5	PD-13	PD-13S
14		14	130.5	PD-14	PD-14S

(A) Supporting standard grease NLGI 1 & 2 (B) Temperature range +10°C~+60°C (C) Addition proximity sensor, monitoring lubrication system is available. (D) To make sure entire pipe line should be full filled with grease for a correct function. (E) If one outlet of distributor is blocked, the successive pumping cycle is not valid.

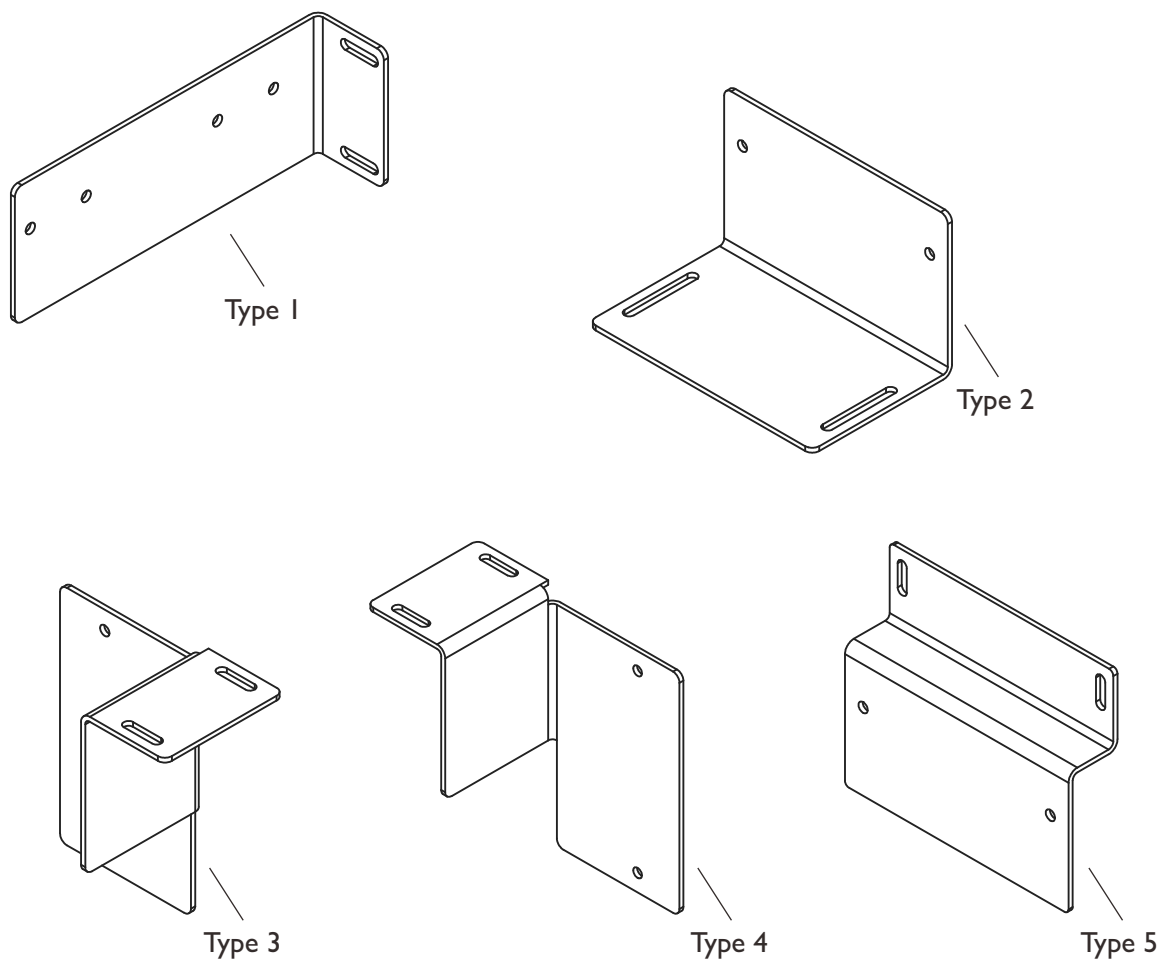
Proximity Sensor Technical Specification

Contact Diagram 	Brown	Operating Voltage: 10~30VDC
	Black	Output Current: 150mA max.
	Blue	GND
Circuit Diagram		
Output Method	PNP	
Output Status	NO	
IP Degree	IP67	
Order Code	Proximity Sensor : PS-01	
	Proximity Sensor Connect Cable : PSL-01	

The sensor lights up when a pumping cycle of the progressive distributor has been done.

Fixing Socket

5 different types of fixing socket for LUG 400.



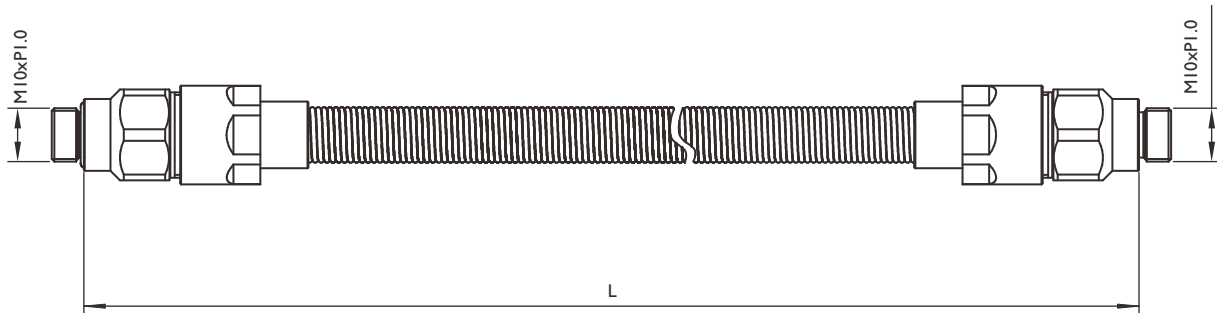
Spec	Order Code
Type 1	BK-01
Type 2	BK-02
Type 3	BK-03
Type 4	BK-04
Type 5	BK-05

- Material : SPCC
- Surface Treatment : Black flat paint
- The drawing for fixing sucket support please contact with APEX

Flexible Tube Set

To used for main lubrication pipe line. The spring is protecting tube, preventing the pipe line expansion due to high pressure and influence of pumping of grease.

- The max length about 15 meter
- The max permitted pressure 100 bar
- Spring is coated with nickel plated and corrosion resistance.
- Operating temperature $-30^{\circ}\text{C}\sim+80^{\circ}\text{C}$

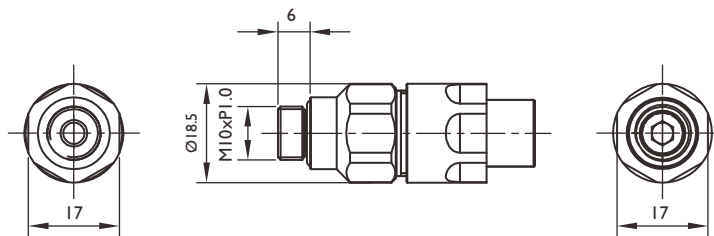


Length (meter)	Order Code
Approx 10	FTS08-1000
Approx 15	FTS08-1500

Accessories

In-Line Connector

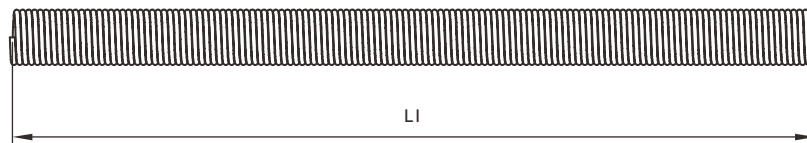
Material: Copper



Length (meter)	Order Code
Applicable Length 10	FTC08-01
Applicable Length 15	FTC08-02

Protective Tube Spring

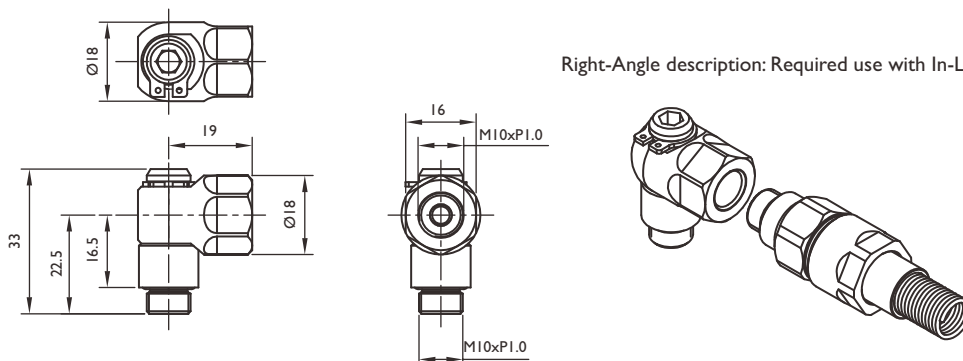
Material: Spring Steel. Surface Treatment: Nickel



Length (meter)	LI (meter)	Order Code
Applicable Length 10	10	PTS08-1000
Applicable Length 15	15	PTS08-1500

■ Right-Angle Connector (Order Code R-FTC08-01)

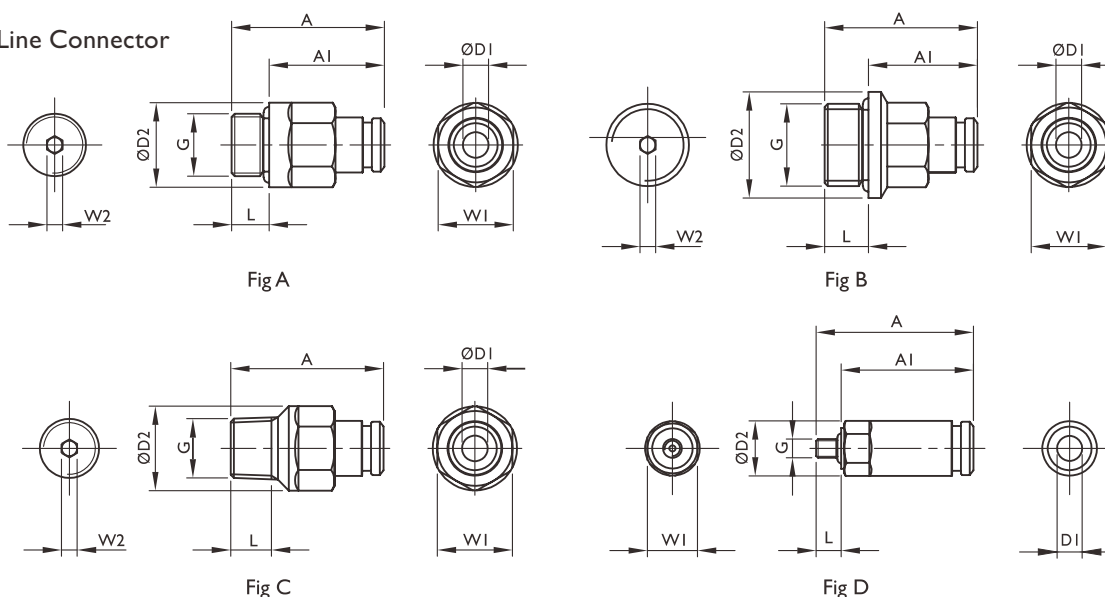
Material: Copper



Right-Angle description: Required use with In-Line connector

● Connector

■ In-Line Connector



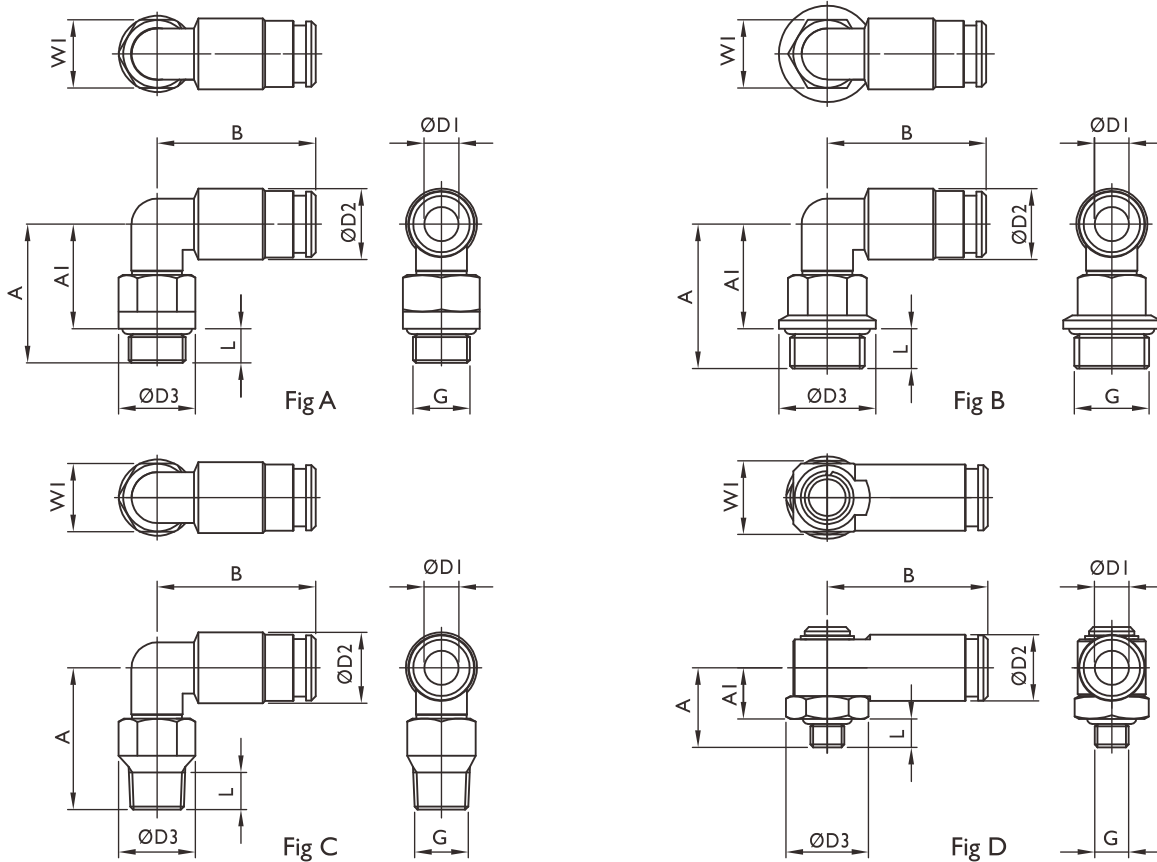
DI	D2	A	AI	G	L	W1	W2	Fig	Order Code	
									Copper	Stainless Steel
4	8.8	25.1	21.1	M3x0.5	4	8	-	D	TB-401 ⁽¹⁾	TBS-401
4	11.5	26.1	21.1	M5x0.8	5	10	-	A	TB-402 ⁽¹⁾	TBS-402
4	11.5	26.1	21.1	M6x0.75	5	10	2.5	A	TB-403	TBS-403
4	11.5	26.1	21.1	M6x1.0	5	10	2.5	A	TB-404	TBS-404
4	11.5	24.4	18.4	M8x1.0	6	10	2.5	A	TB-405	TBS-405
4	13.5	24.4	18.4	M10x1.0	6	12	2.5	A	TB-406	TBS-406
4	13.5	24.4	18.4	G 1/8"	6	12	2.5	A	TB-407	TBS-407
6	13.5	30.1	25.1	M5x0.8	5	12	-	A	TB-601 ⁽¹⁾	TBS-601
6	13.5	30.1	25.1	M6x0.75	5	12	3	A	TB-602	TBS-602
6	13.5	30.1	25.1	M6x1.0	5	12	3	A	TB-603	TBS-603
6	13.5	30.9	24.9	M8x1.0	6	12	4	A	TB-604	TBS-604
6	13.5	28.4	22.4	M10x1.0	6	12	4	A	TB-605	TBS-605
6	13.5	28.4	22.4	G 1/8"	6	12	4	A	TB-606	TBS-606
6	17	29.4	22.4	G 1/4"	7	12	4	B	TB-607	TBS-607
6	13.5	29.9	-	R 1/8"	6.5	12	4	C	TB-608	TBS-608
8	15.2	33.3	27.3	M10x1.0	6	14	5	A	TB-801	TBS-801
8	15.2	33.3	27.3	G 1/8"	6	14	5	A	TB-802	TBS-802
8	17	33.3	26.3	G 1/4"	7	14	5	B	TB-803	TBS-803

(1) Material: Carbon Steel

Operating Pressure : max. 80 bar

Operating Temperature : -30°C~+100°C

● Right-Angle Connector



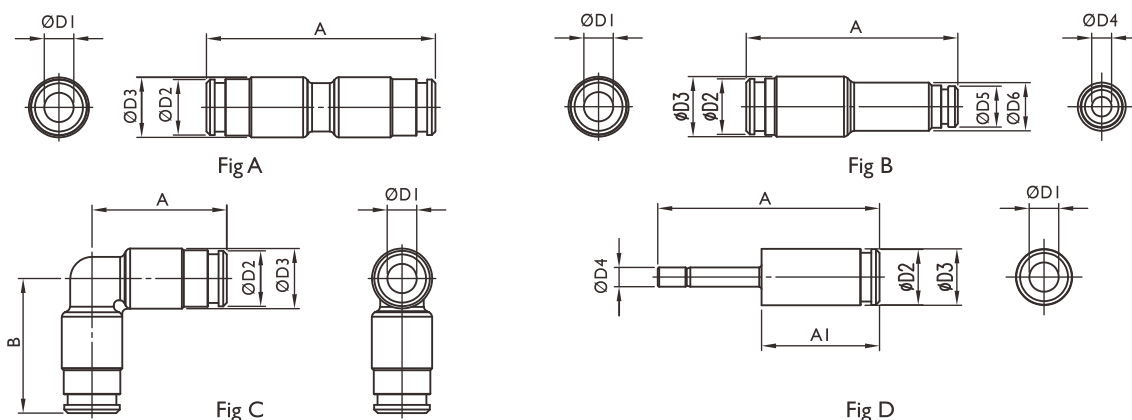
D1	D2	D3	A	AI	B	G	L	WI	Fig	Order Code	
										Copper	Stainless Steel
4	10	11.5	18.7	14.7	22.4	M3 x 0.5	4	10	A	R-TB-401 ⁽¹⁾	R-TBS-401
4	10	11.5	20.7	15.7	22.4	M5 x 0.8	5	10	A	R-TB-402 ⁽¹⁾	R-TBS-402
4	10	11.5	20.7	15.7	22.4	M6 x 0.75	5	10	A	R-TB-403	R-TBS-403
4	10	11.5	20.7	15.7	22.4	M6 x 1.0	5	10	A	R-TB-404	R-TBS-404
4	10	13.5	23.2	17.2	22.4	M8 x 1.0	6	12	A	R-TB-405	R-TBS-405
4	10	13.5	24.2	18.2	22.4	M10 x 1.0	6	12	A	R-TB-406	R-TBS-406
4	10	13.5	24.2	18.2	22.4	G 1/8"	6	12	A	R-TB-407	R-TBS-407
4	8.8	14.5	14	9	24.2	M6 x 1.0	5	13	D	R-TB-408	R-TBS-408
4	8.8	14.5	15	9	24.2	M8 x 1.0	6	13	D	R-TB-409	R-TBS-409
4	8.8	14.5	17.5	9	24.2	R 1/8"	8.5	13	D	R-TB-410	R-TBS-410
6	12.5	11.5	21	16	27.9	M5 x 0.8	5	10	A	R-TB-601 ⁽¹⁾	R-TBS-601
6	12.5	11.5	21	16	27.9	M6 x 0.75	5	10	A	R-TB-602	R-TBS-602
6	12.5	11.5	21	16	27.9	M6 x 1.0	5	10	A	R-TB-603	R-TBS-603
6	12.5	13.5	23.5	17.5	27.9	M8 x 1.0	6	12	A	R-TB-604	R-TBS-604
6	12.5	13.5	24.5	18.5	27.9	M10 x 1.0	6	12	A	R-TB-605	R-TBS-605
6	12.5	13.5	24.5	18.5	27.9	G 1/8"	6	12	A	R-TB-606	R-TBS-606
6	12.5	17	25.5	18.5	27.9	G 1/4"	7	12	B	R-TB-607	R-TBS-607
6	12.5	13.5	25	-	27.9	R 1/8"	6.5	12	C	R-TB-608	R-TBS-608
6	11.7	14.5	14	9	28.2	M6 x 1.0	5	13	D	R-TB-609	R-TBS-609
6	11.7	14.5	15	9	28.2	M8 x 1.0	6	13	D	R-TB-610	R-TBS-610
6	11.7	14.5	17.5	9	28.2	R 1/8"	8.5	13	D	R-TB-611	R-TBS-611
8	14.5	14.5	25.5	19.5	29.8	M10 x 1.0	6	13	A	R-TB-801	R-TBS-801
8	14.5	14.5	25.5	19.5	29.8	G 1/8"	6	13	A	R-TB-802	R-TBS-802
8	14.5	17	25.5	19.5	29.8	G 1/4"	7	13	B	R-TB-803	R-TBS-803

(1) Material: Carbon Steel

Operating Pressure : max. 80 bar

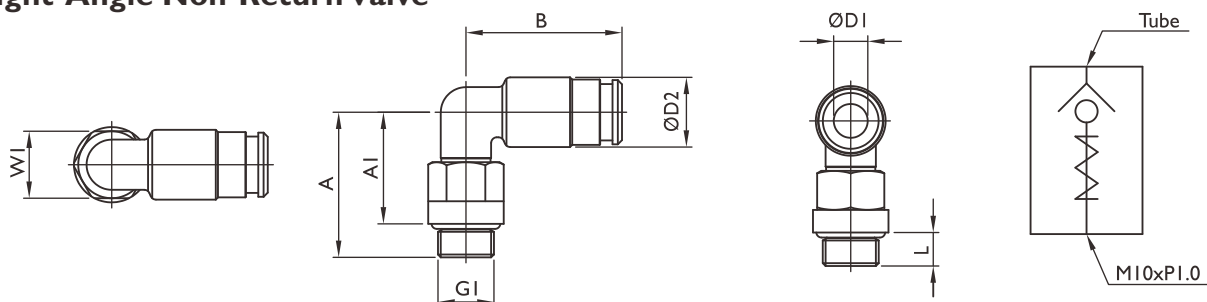
Operating Temperature : -30°C~+100°C

• **Tube Connector**



D1	D2	D3	D4	D5	D6	A	AI	B	Fig	Order Code	
										Copper	Stainless Steel
4	8.5	10.0	-	-	-	39.8	-	-	A	C-TB-401	C-TBS-401
4	8.5	10.0	-	-	-	22.4	-	22.4	C	C-TB-402	C-TBS-402
4	8.5	8.8	6	-	-	45.4	20.4	-	D	C-TB-403	C-TBS-403
6	11.5	12.5	-	-	-	47.8	-	-	A	C-TB-601	C-TBS-601
6	11.5	12.5	4	8.5	10	43.8	-	-	B	C-TB-602	C-TBS-602
6	11.5	12.5	-	-	-	27.9	-	27.9	C	C-TB-603	C-TBS-603
6	11.5	11.7	4	-	-	45.9	24.4	-	D	C-TB-604	C-TBS-604
8	13.5	15	6	11.5	12.5	49.2	-	-	B	C-TB-801	C-TBS-801
8	13.5	13.8	6	-	-	51.3	26.3	-	D	C-TB-802	C-TBS-802

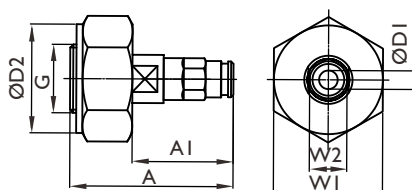
• **Right-Angle Non-Return Valve**



D1	D2	A	AI	B	GI	L	WI	Order Code	
								Copper	Stainless Steel
4	10	24.2	18.2	22.4	M10 x 1.0	6	12	RV-TB-401	RV-TBS-401
6	12.5	26	20	27.9	M10 x 1.0	6	12	RV-TB-601	RV-TBS-601
8	14.5	27	21	29.8	M10 x 1.0	6	13	RV-TB-801	RV-TBS-801

Function of Non-Return Valve: Avoid of backflow, Resistance of pressure.

• **Oil Filling Connector**



D1	D2	A	AI	G	W1	W2	Order Code
4	35	48.4	28.4	M22 x 2.0	35	12	TB-4-22
6	35	52.4	32.4	M22 x 2.0	35	12	TB-6-22
8	35	57.3	37.3	M22 x 2.0	35	14	TB-8-22

The oil filling connector is to apply for refilling of lubricant.

High kinematic viscosity of lubricant will reduce the pumping distance to the device or facility.

Pay attention to kinematic viscosity by refilling of Non-APEX lubricant.

Lubricator Cartridge

- **Empty Cartridge (Order code : G00)**

For Self-Filling of grease.

Oil Filling Connector is necessary

Supports LUG-400 lubricator

- **Standard Grease (Order code : G01)**

NLGI Grade 2

Temperature Range $-30^{\circ}\text{C}\sim+140^{\circ}\text{C}$

Containing PTFE, good performance in high pressure and metal adhesion.

Suitable for high loading gear transmission system.

Suitable for high temperature environment.

Kinematic Viscosity 32 cSt/40°C

Supports LUG lubricator pre-fill at 400 cm³

- **Food Grade Grease (Order Code : G02)**

NLGI Grade 2

Temperature Range $-35^{\circ}\text{C}\sim+120^{\circ}\text{C}$

NFS H1 license.

Provide good wearing resistance and extend lubrication interval.

Food Grade Grease is Non-toxic, Odorless, Colorless and tasteless.

Kinematic Viscosity 50 cSt/40°C

Supports LUG lubricator pre-fill at 400 cm³

- **Low Temperature Grease (Order Code : G03)**

NLGI Grade 2

Temperature Range $-50^{\circ}\text{C}\sim+120^{\circ}\text{C}$

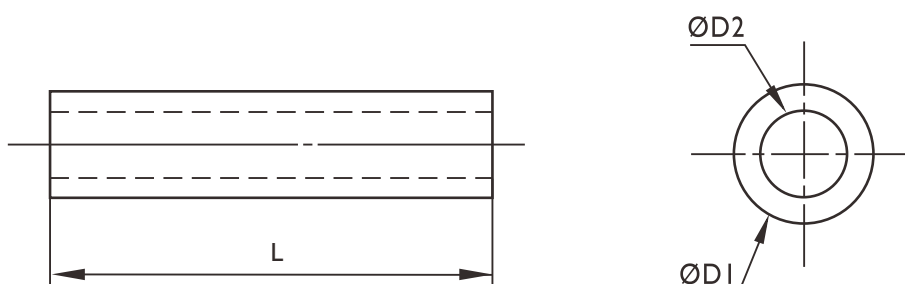
Contains special additives for anti-wear, anti-corrosion and high pressure resistance.

Suitable for high loading gear transmission system.

Kinematic Viscosity 15 cSt/40°C

Supports LUG lubricator pre-fill at 400 cm³

PA Tube



Type of Grease	D1	D2	L max. (meter)	Order Code
Empty Tube	4	2.5	200	T04
	6	4	200	T06
	8	5	100	T08

Tube material : PA 12.

Operating Pressure: 25 kg/cm² by 4mm PA Tube; 28kg/cm² by 6mm & 8mm PA Tube (Temperature 20°C)

Operating Temperature: -40°C~+80°C

It's PA tube. The maximal WORKING length of the PA tube is depending on the tube diameter and the viscosity of grease inside. The guaranteed working length is (in meter):

Grease	Tube	T04	T06	T08
Standard Grease (G01)		5m	10m	10m
Food Grade Grease (G02)		5m	5m	10m
Low Temperature Grease (G03)		5m	10m	10m

Using the flexible tube set, the pumping volume of the grease will be more precise due to the non-expansion of the tube under high pressure.

Trouble Shooting

Failure / Error	Cause	Process
Lubricator		
Unable to Dispense Grease	A. No Grease into Cartridge	A. Replace Cartridge
	B. Motor Idling	B. Contact APEX
	C. Fuel Sensor Failure	C. Contact APEX
Grease Leak	A. Wear or Breakage of the Seal	A. Replace
	B. Confirming Locked for the Connector	B. The Correct Tightening Torque Locking
Main Tube for Lubricator		
Unable to Dispense Grease for Main Tube	A. Refer [Lubricator] Unable to Dispense Grease Item	
	B. Main Tube Damage	B. Replace Main Tube
	C. Main Tube Blockage	C. Confirm the Cause and Eliminate Obstruction
Main Tube Contains Trapped Air	A. Cartridge Contains Trapped Air	A. Replace Cartridge
	B. Main Tube Damage	B. Replace Main Tube
	C. Improper Assembly for Main Tube and Connector	C. Indeed Assembly
Distributor		
Unable to Dispense Grease	A. Refer [Main Tube of Lubricator] Main Tube Unable to Dispense Grease Item	
	B. Distributor Blockage	B. Replace Distributor
	C. Distributor not Fully Fill With Grease	C. Initial be sure to fill up with Grease before dispense oil
Grease Leak	A. Confirming Locked for the Connector	A. The Correct Tightening Torque Locking
Feed Grease Tube for Distributor		
Unable to Dispense Grease	A. Refer [Distributor] Unable to Dispense Grease Item	
	B. Feed Grease Tube Damage	B. Replace Feed Grease Tube
	C. Feed Grease Tube Blockage	C. Confirm the Cause and Eliminate Obstruction
Feed Grease Tube Contains Air	A. Refer [Main Tube of Lubricator] - Feed Grease Tube Contains Air Item	
	C. Feed Grease Tube improperly assembly with connector set	B. Indeed Assembly
	C. Feed Grease Tube Damage	C. Replace Feed Grease Tube
Proximity Sensor		
Sensor Output Signals Can Not be Converted	A. Refer [Main Tube of Lubricator] Main Tube Unable to Outlet Grease Item	
	B. Feed Grease Tube Blockage from Distributor	B. Confirm the Cause and Eliminate Obstruction
	C. Proximity Sensor Damage	C. Replace Proximity Sensor



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