



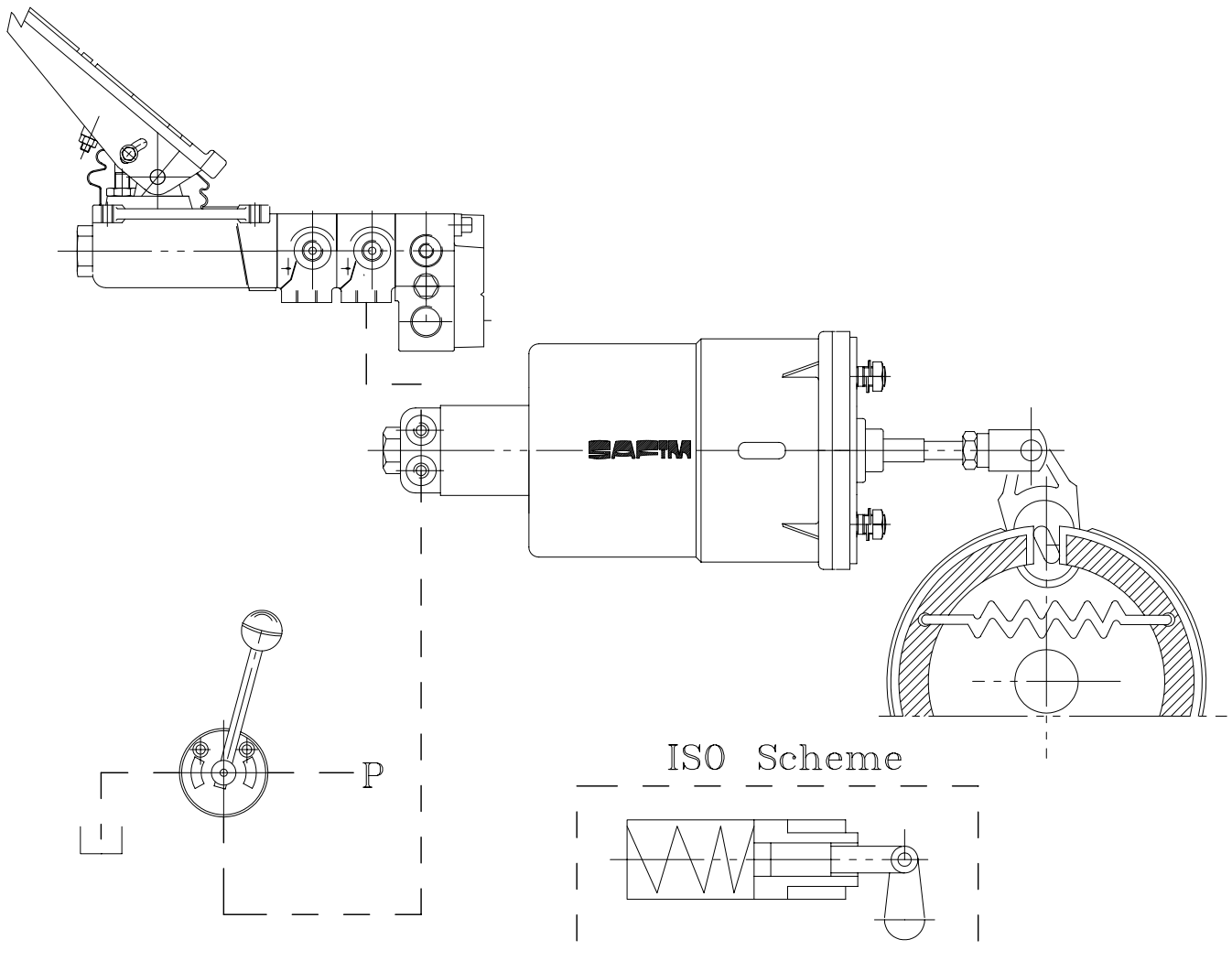
- **MULTI-FUNCTION CYLINDERS (For service, parking and emergency braking)**
- **PARKING SPRING CYLINDER**
- **SLAVE CYLINDER**
- **PROPORTIONAL VALVE**
- **PRIORITY VALVE**
- **STEERING VALVE**
- **3 WAY CONTROL VALVE**
- **ACCUMULATORS**

Description: These multi-function cylinders are designed to operate lever-type mechanical brakes with double functions service brake + parking brake and, with a suitable control system, to provide emergency braking. They comprise two sections: one of these is a single-acting hydraulic cylinder (for service braking) while the other consists of a cylinder + spring (for parking brakes). The main feature is that they avoid the sum of the forces deriving from the service and parking brake, dangerous for the brakes. They are available in three sizes.

Operation: The service brake section comprises a single-acting hydraulic cylinder to the brake control device. The parking brake section comprises a spring and a counter-cylinder. The spring provides the force required to activate the brake, while the cylinder controls and cancels this force, compressing the spring. This counter-cylinder may be operated by a three-way electrically or manually operated control valve or by a proportional flow valve 20.1978 if used for emergency braking.

Applications: The composite cylinder can be fitted to dumper fork lift truck, lorry mounted crane, cement mixer, etc..

Attention: The constructor of the vehicle should provide means for the driver to check the efficiency of the parking and/or emergency brakes on a regular basis.



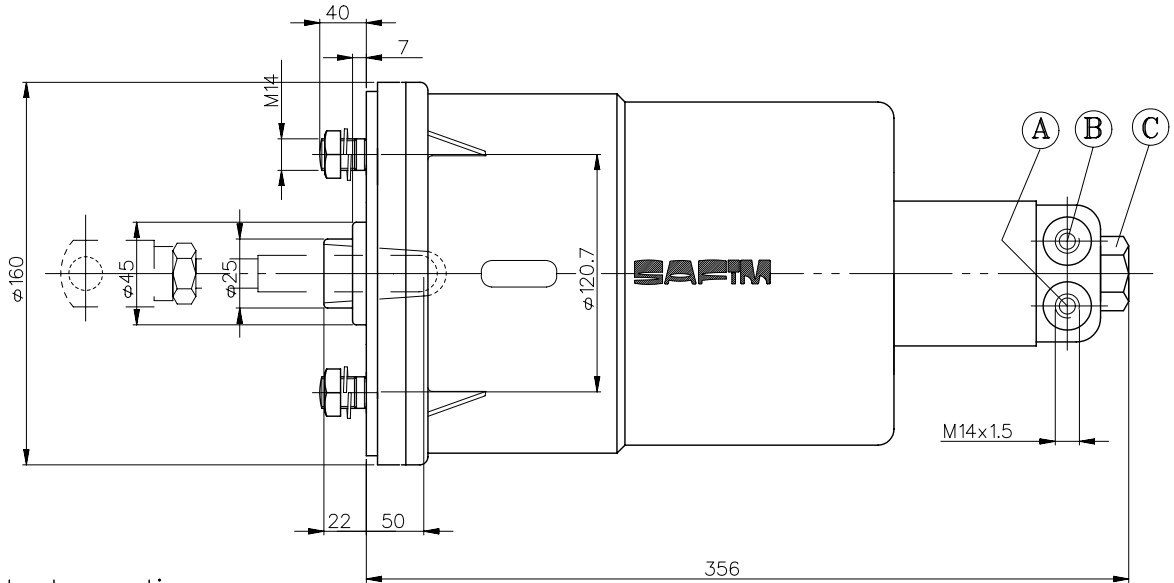


Multi-function cylinder
(Service - Parking)

04.01.02

Last revision
11.00

ORDER PART NUMBER: 301181



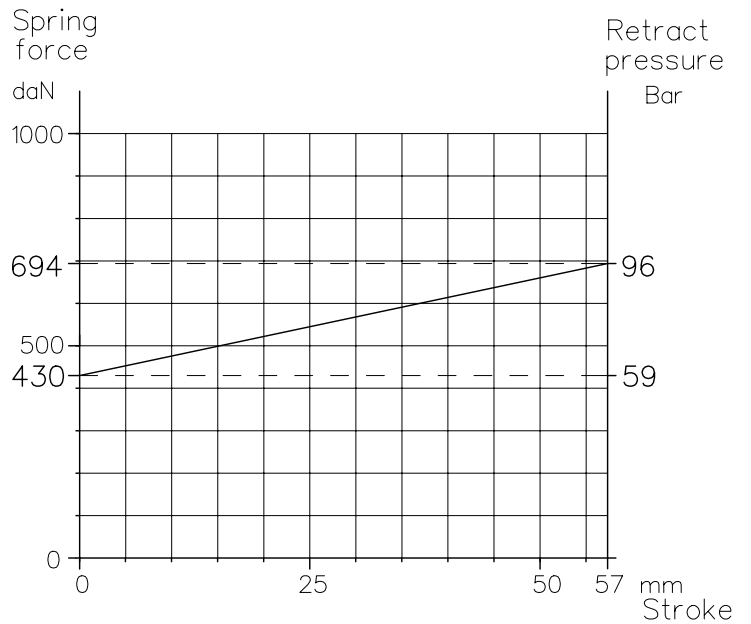
Service brake section

Stroke	(mm)	57
Slave cyl. \varnothing	(mm)	25
Slave cyl. volume	(cm ³)	27.9
Max pressure	(Bar)	180

Diagram illustrating brake-force
(Theoretical data)

Parking brake (spring)

Stroke	(mm)	57
Retract pressure	(Bar)	115
Retract cyl. volume	(cm ³)	41.3
Max spring force	(daN)	694±69
Min. spring force	(daN)	430±43
Max pressure	(Bar)	200



A	Service brake port
B	Parking brake release port
C	Manual release

Attention: The constructor of the vehicle should provide means for the driver to check the efficiency of the parking and/or emergency brakes on a regular basis.

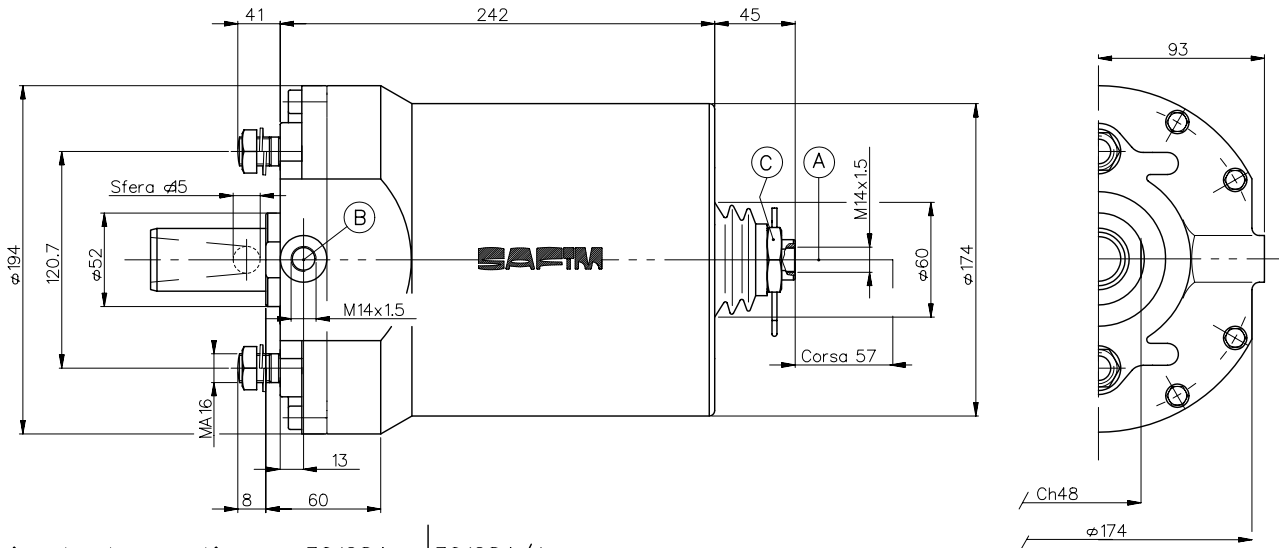


Multi-function cylinder (Service - Parking)

04.01.03

Last revision
11.00

ORDER PART NUMBER: 301284 - 301284/1



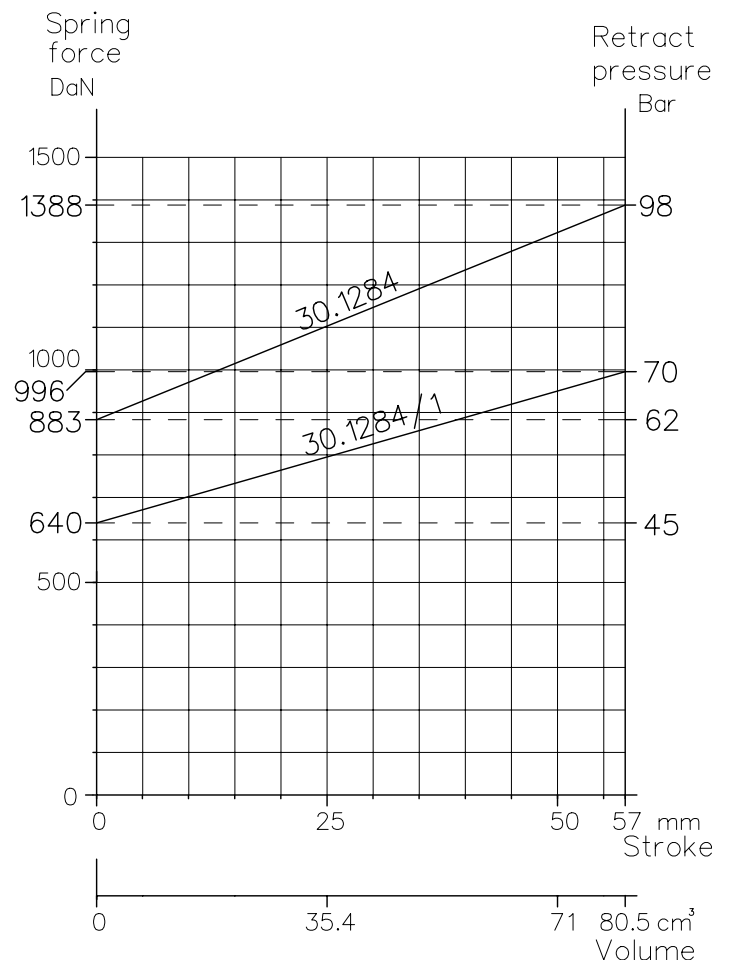
Service brake section 301284 301284/1

Stroke	(mm)	57	57
Slave cyl. \varnothing	(mm)	35	35
Slave cyl. volume	(cm ³)	54.8	54.8
Max pressure	(Bar)	200	200

Spring apply section 301284 301284/1

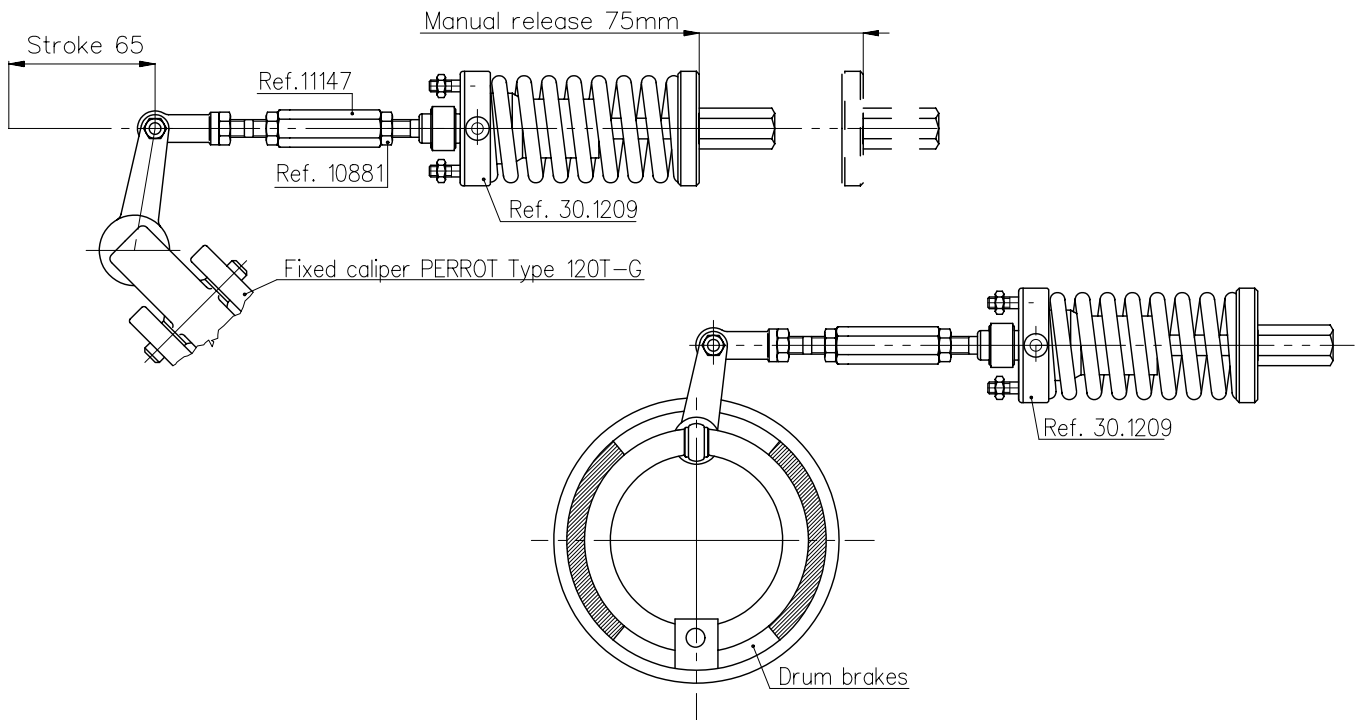
Stroke	(mm)	57	57
Retract pressure	(Bar)	119	78
Retract cyl. volume	(cm ³)	80.5	80.5
Max spring force	(daN)	1388±139	996±100
Min. spring force	(daN)	883±88	640±64
Max pressure	(Bar)	200	200

Diagram illustrating brake-force
(Theoretical data)



A	Service brake port
B	Parking brake release port
C	Manual release

Attention: The constructor of the vehicle should provide means for the driver to check the efficiency of the parking and/or emergency brakes on a regular basis.



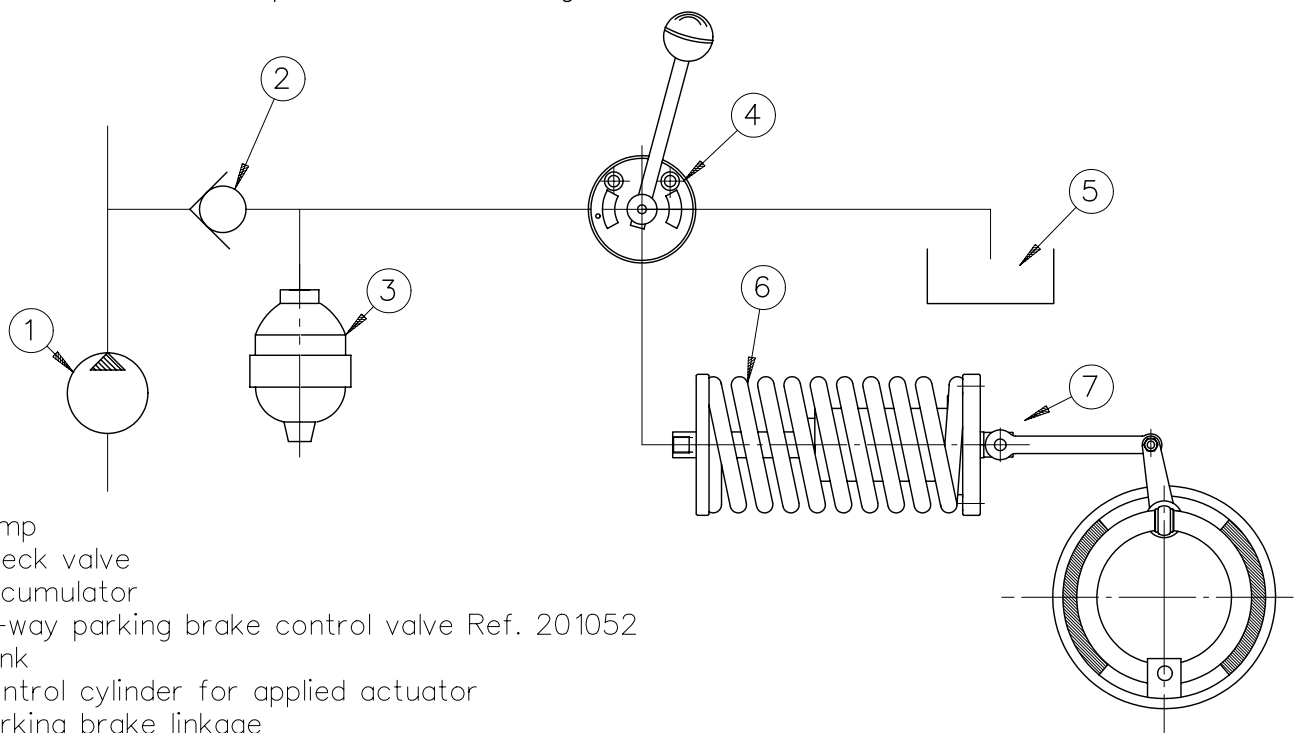
Parking brake components and circuit diagram

This circuit provides for mechanical operation of parking brakes utilizing a coil spring with hydraulic control, and simplifies conventional systems where application of the brake either involves excessive physical effort, or is rendered cumbersome by overcrowding of levers and linkages.

The hydraulic cylinder is normally under pressure, in retracted position.

Shifting the handle of a 3-way valve, fluid is exhausted, allowing the spring to expand and apply the brake.

An accumulator ensures operation with the engine switched off or stalled.



1. Pump
2. Check valve
3. Accumulator
4. 3-way parking brake control valve Ref. 201052
5. Tank
6. Control cylinder for applied actuator
7. Parking brake linkage

ORDER PART NUMBER: 301209

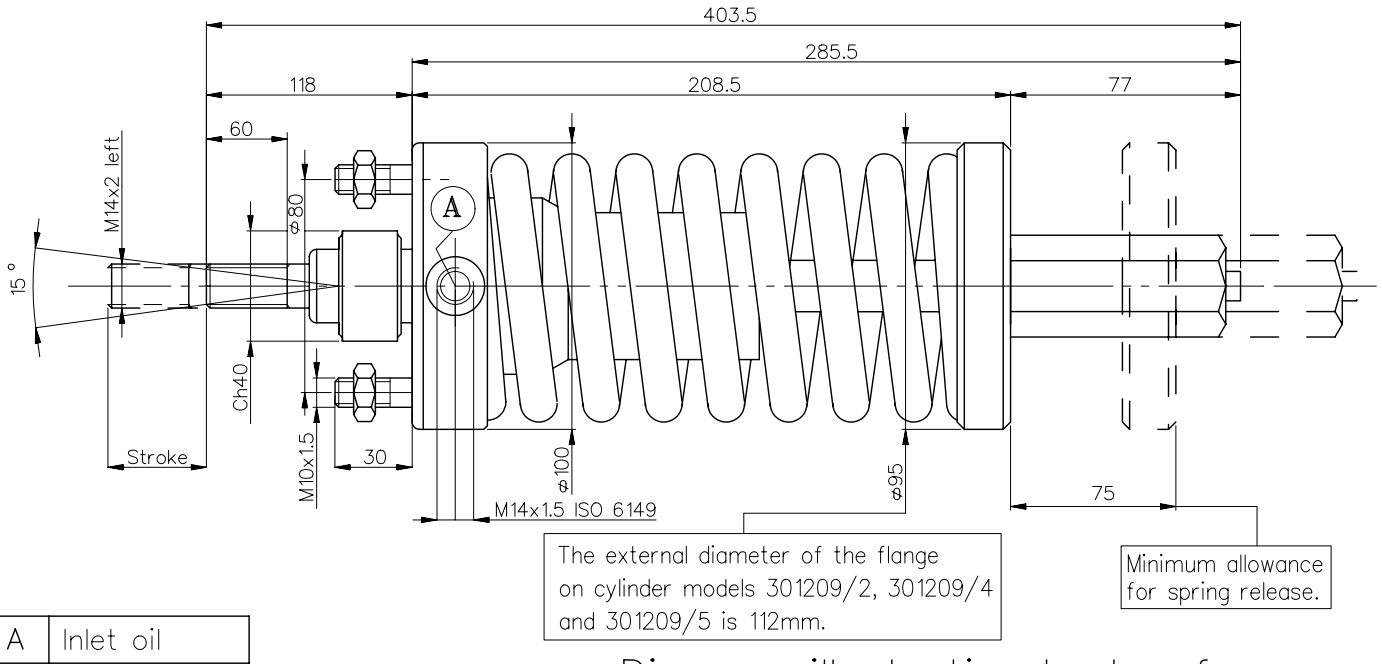
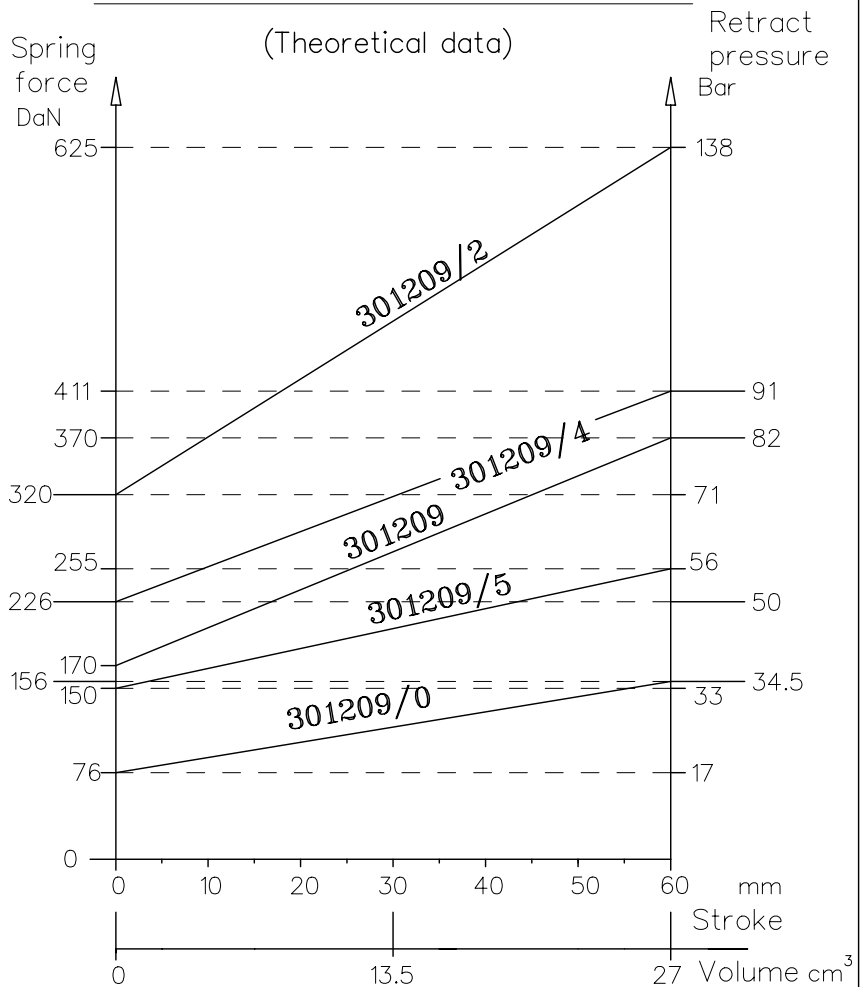


Diagram illustrating brake-force

Technical characteristics		
Stroke	(mm)	60
Retract volume cylinder	(cm ³)	27
Max pressure	(Bar)	180

Technical characteristics			
Order part number	Min. spring force (daN)	Max spring force (daN)	Retract pressure (Bar)
301209/0	76±8	156±16	42
301209/5	150±15	255±26	68
301209	170±17	370±37	99
301209/4	226±23	411±41	110
301209/2	320±32	625±63	168

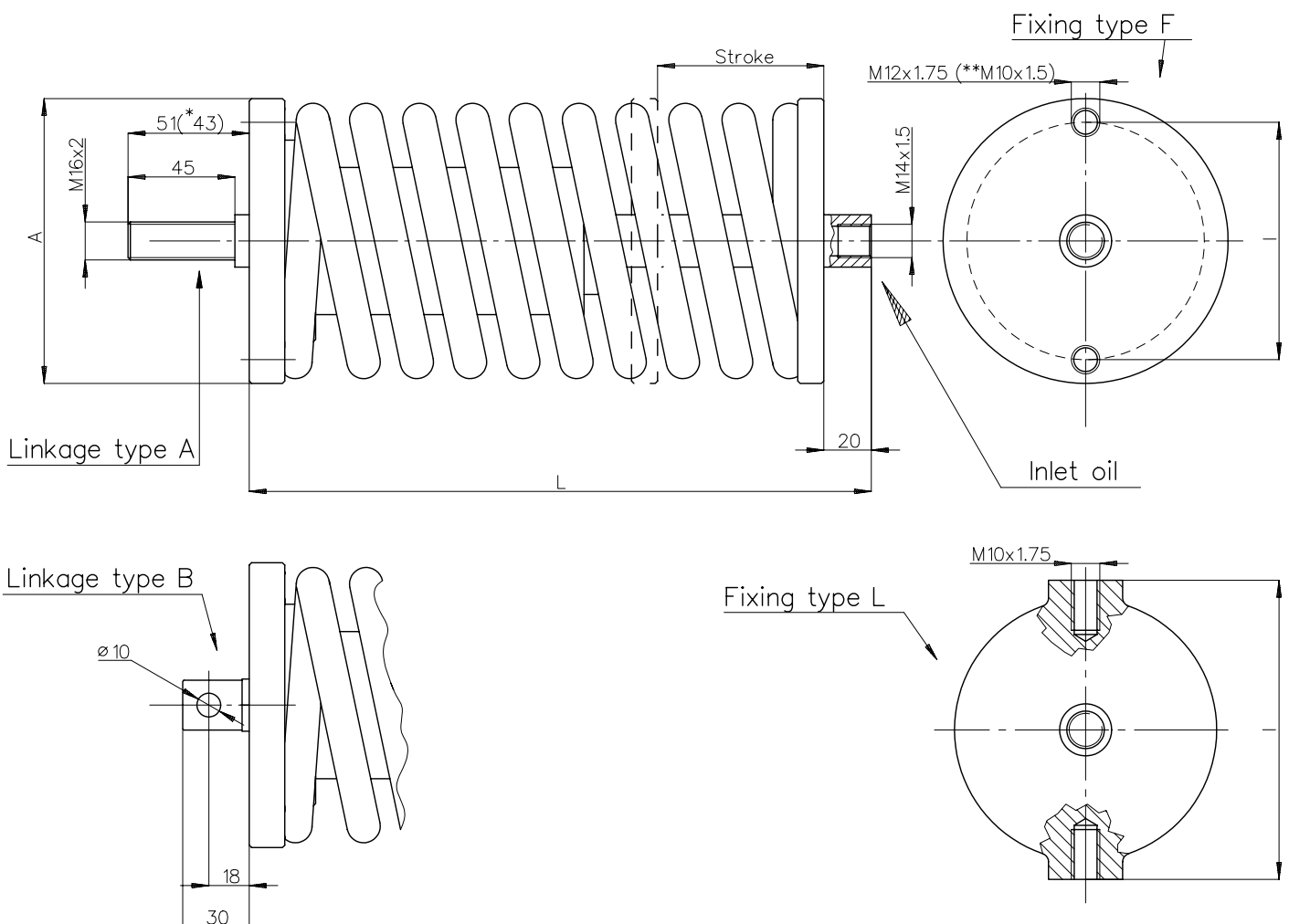


Attention: The constructor of the vehicle should provide means for the driver to check the efficiency of the parking and/or emergency brakes on a regular basis. The springs in these cylinders are exposed. The constructor must provide adequate protection to safeguard the operators and to guarantee good performance from the cylinders.

Dimensions and performance

Order part. No.	L (mm)	A (mm)	I (mm)	Fixing type	Linkage type	Stroke (mm)	Volume (cc)	Min force (daN)	Max force (daN)	Retract pressure (Bar)
301033	262	120	100	F	A	70	122	332±33	661±66	46
301033/1	262	120	100	F	A	70	122	524±52	1057±106	74
301175	262	120	100	F	B	70	122	332±33	661±66	46
301175/1	262	120	100	F	B	70	122	524±52	1057±106	74
301068	270	120	100	F	A *	70	283	275±28	654±65	20
302389	270	120	100	F	B	70	283	275±28	654±65	20
301034	262	110	105	L	A	70	122	154±15	500±50	35
301034B	262	110	105	L	B	70	122	154±15	500±50	35
301034F	262	110	80	F **	A	70	122	154±15	500±50	35
301034FB	262	110	80	F **	B	70	122	154±15	500±50	35
301034H	262	110	105	L	A	50	87	154±15	398±40	28
302391H	262	110	80	F **	B	50	87	154±15	398±40	28

ATTENTION: The force and pressure values are only theoretical. The indicative values are subject to variation of 10%



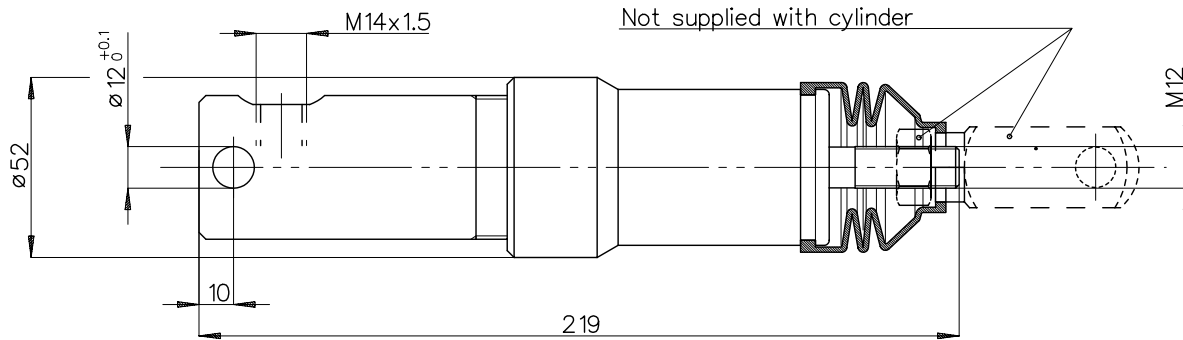
Attention: The constructor of the vehicle should provide means for the driver to check the efficiency of the parking and/or emergency brakes on a regular basis. The springs in these cylinders are exposed. The constructor must provide adequate protection to safeguard the operators and to guarantee good performance from the cylinders.



Spring actuator hydraulic operate cylinder

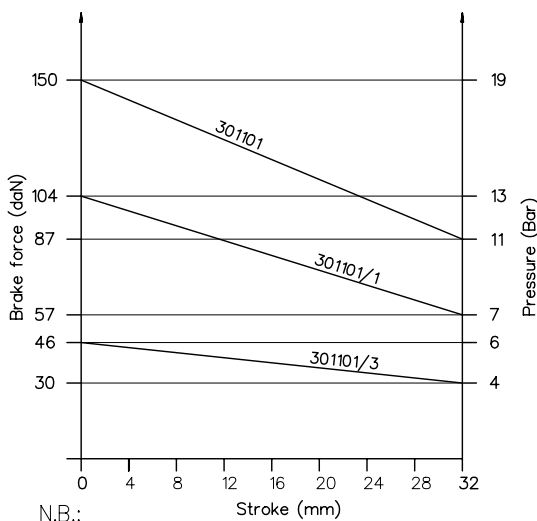
04.02.04

Last revision
05.03



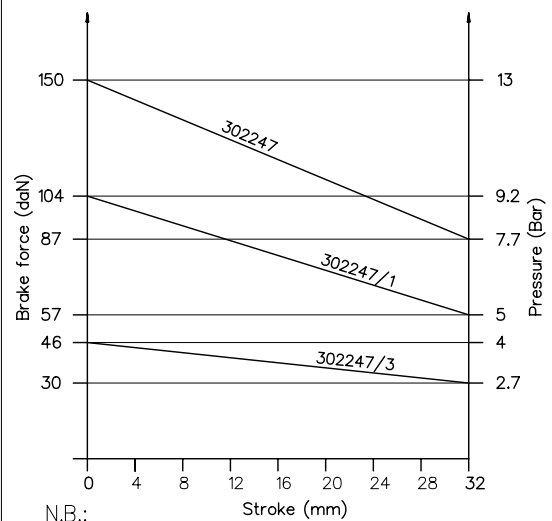
Order Part No.	Stroke	Max. brake force	Min. brake force	Retract pressure	Maximum pressure	Retract cyl. volume
302247	32 mm	150±15 daN	87±8.7 daN	16 bar	70 bar	36.2 cm ³
301101	32 mm	150±15 daN	87±8.7 daN	23 bar	150 bar	25.3 cm ³
302247/1	32 mm	104±10.4 daN	57±5.7 daN	11 bar	70 bar	36.2 cm ³
301101/1	32 mm	104±10.4 daN	57±5.7 daN	16 bar	150 bar	25.3 cm ³
302247/3	32 mm	46±4.6 daN	30±3 daN	5 bar	70 bar	36.2 cm ³
301101/3	32 mm	46±4.6 daN	30±3 daN	7 bar	150 bar	25.3 cm ³

Diagram illustrating Brake force



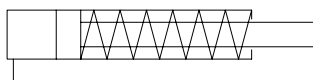
N.B.:
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Diagram illustrating Brake force

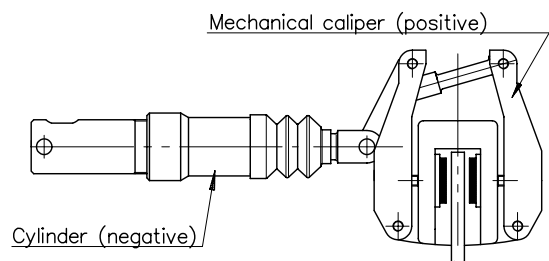


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ISO symbol



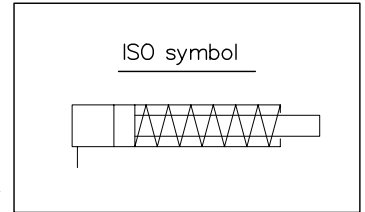
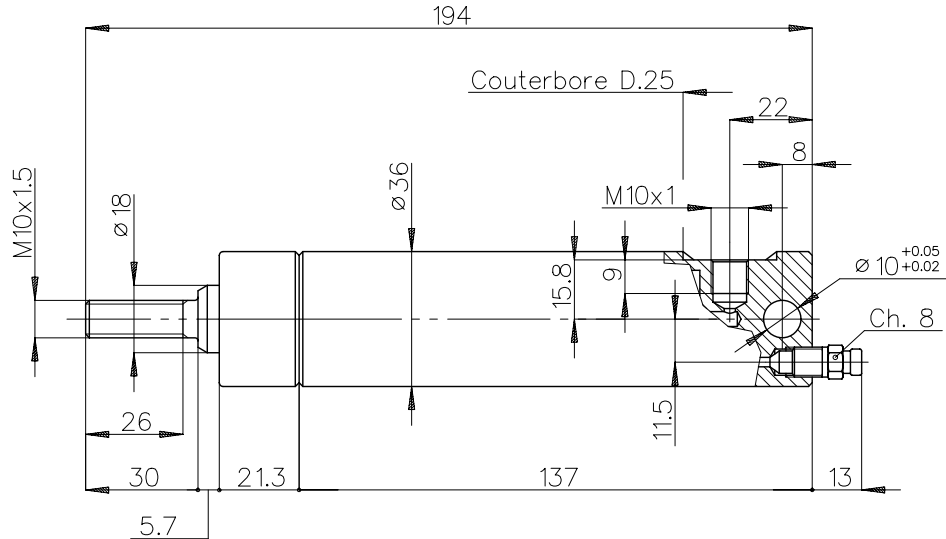
Example of application



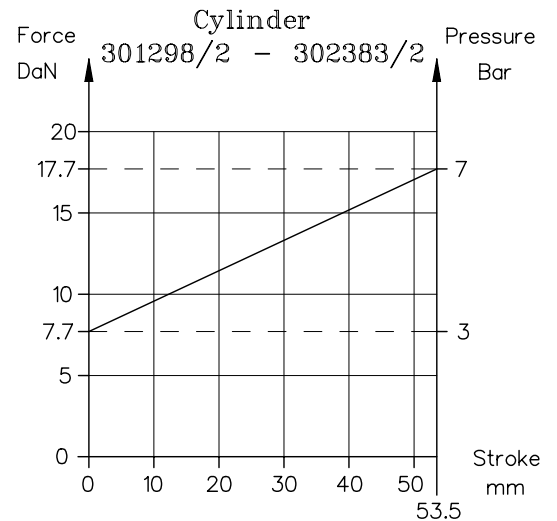
ATTENTION:

A safety release mechanism must be installed, to operate in the event of an emergency.
The brake force of the spring should be controlled on a regular basis.

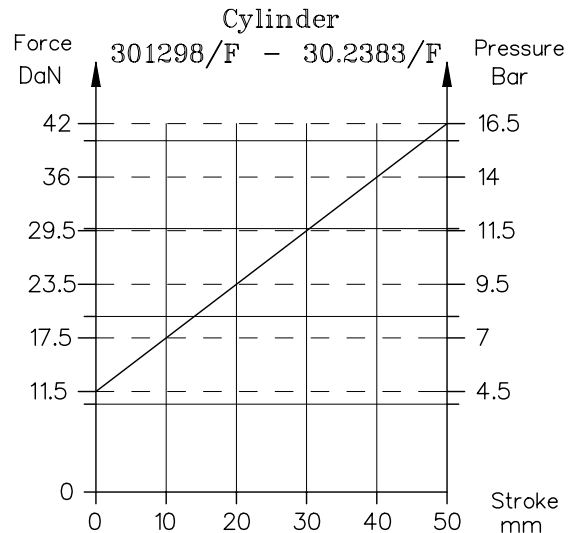
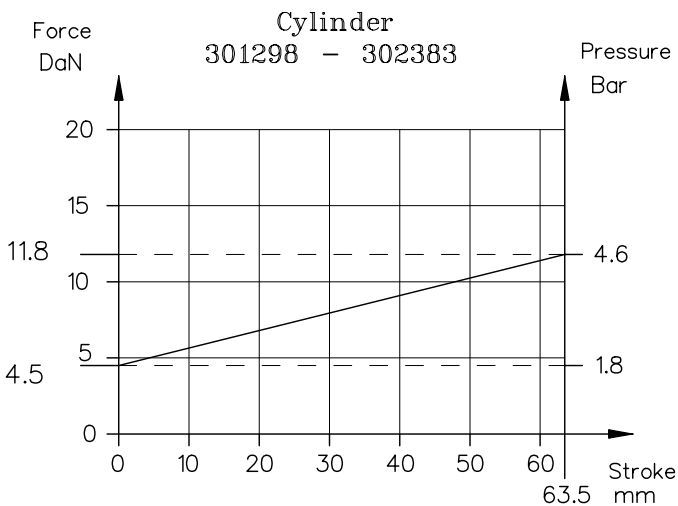
ORDER PART NUMBER: 301298 - 302383



Order part. No.	301298	302383*	301298/2	302383/2*	301298/F	302383/F*
Stroke (mm)	63.5	63.5	53.5	53.5	50	50
Cyl. diameter (mm)	18	18	18	18	18	18
Volume cyl. (cm ³)	16.2	16.2	13.6	13.6	12.7	12.7
Oil type	Mineral oil	Mineral oil	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Max. pressure (Bar)	100	70	100	70	100	70
Min. spring force (daN)	4.5±0.5	4.5±0.5	7.7±0.8	7.7±0.8	11.5±1.2	11.5±1.2
Max spring force (daN)	11.8±1.2	11.8±1.2	17.7±1.8	17.7±1.8	42±4.2	42±4.2
Retract pressure (Bar)	5.6	5.6	8.4	8.4	20	20

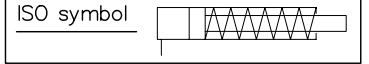


* Cylinder useful to low pressures

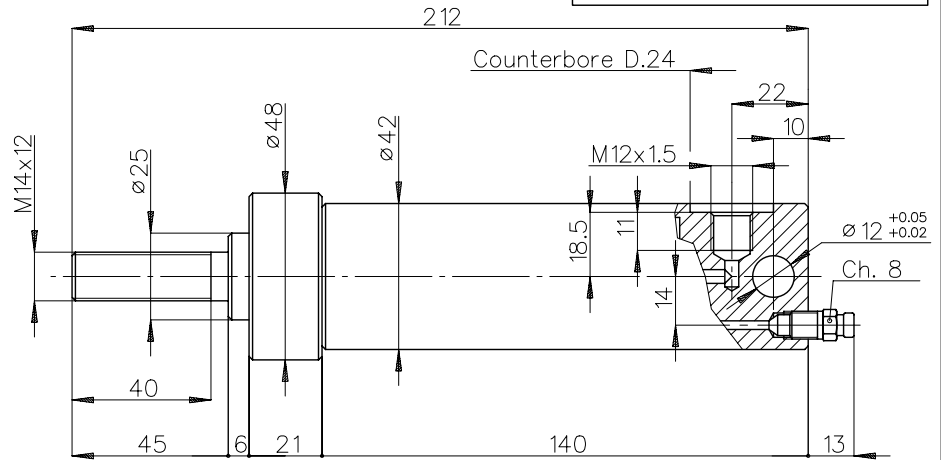


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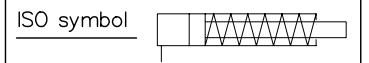
ORDER PART NUMBER: 301276 - 301277



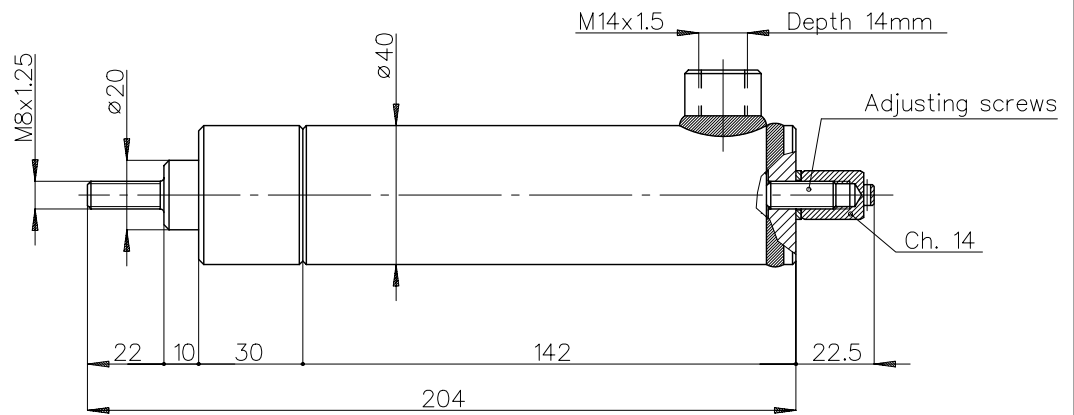
Order part number	301276	301277
Oil type	Mineral oil	Brake fluid DOT 3-4
Stroke (mm)	40	40
Diam. cyl. (mm)	25	25
Volume cyl. (cm ³)	19.6	19.6
Max pressure (Bar)	100	100
Min. spring force (daN)	21±2.1	21±2.1
Max spring force (daN)	27±2.7	27±2.7
Retract pressure (Bar)	6.7	6.7



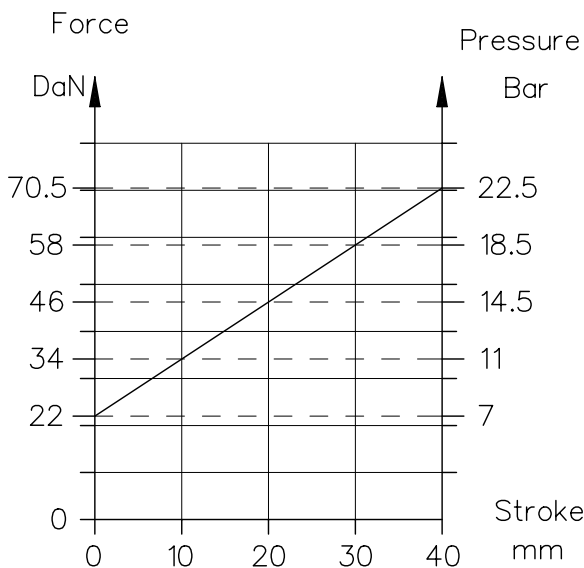
ORDER PART NUMBER: 302074



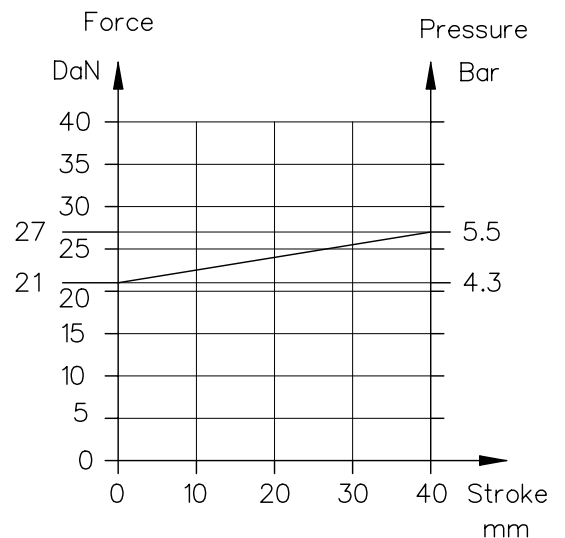
Order part number	302074
Oil type	Mineral oil
Stroke (mm)	40
Diam. cyl. (mm)	20
Volume cyl. (cm ³)	12.6
Max pressure (Bar)	100
Min. spring force (daN)	22±2.2
Max spring force (daN)	70.5±7
Retract pressure (Bar)	27.1



Cylinder 302074



Cylinders 301276 - 301277



ATTENTION: The force-pressure values are only theoretical.