		Page
Pneumatically actuated tension brakes with internally ventilated brake disc	**Series 0454**	
Operation		7.03.00
Properties, areas of application		7.03.00
Construction and installation		7.03.00
Torque variations		7.04.00
Permissible frictional power		7.04.00
Dimensions, design variations		7.05.00
Brake caliper complete		7.06.00
Bracket for brake caliper		7.08.00
Axial Fan		7.09.00
Pneumatically actuated wet-running high power brake	**Series 0444**	
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Continuous strip tension controllers and continuous strip tension regulators		
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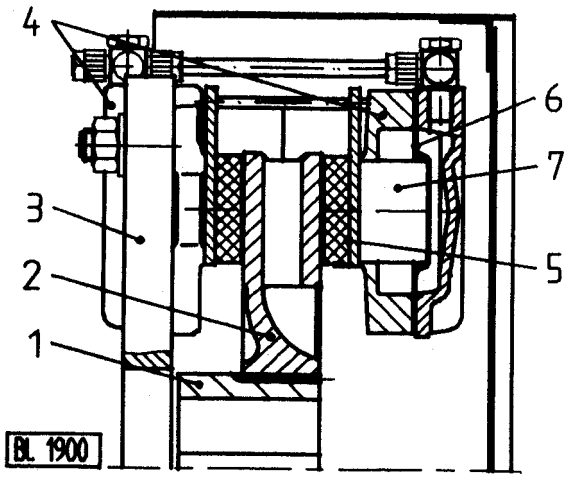
Tension brake

Operation



The splined internal drive hub (**1**) is connected to the unwinding shaft. Mounted on the drive hub is the brake disc (**2**) which can move axially. The brake calipers (**4**) mounted on the flange (**3**) surround the brake disc. They are actuated by compressed air, pressing the brake pads (**5**) onto the brake disc. Here the level of the braking pressure determines the braking torque generated. When the brake pressure is removed the diaphragm (**6**) pulls the piston (**7**) back into its starting position. The brake pad is lifted off the brake disc, which can then move without any residual torque.

Properties, areas of application

The brakes are mainly used for continuous braking processes predominantly on unwinding equipment. In controlled or regulated processes the brake is the actuator.
In this area the Ortlinghaus tension brake fulfils the following requirements

- sensitive response, low hysteresis
- facility to switch in or out each caliper
- good heat dissipation
- quiet running

Ortlinghaus tension brake, the important features are:

- low friction actuation unit with diaphragm, low volumetric capacity
- modular construction
- internally vented brake disc
- splined internal drive hub
- dual contact pressure on the friction linings

For the control of the brake, Ortlinghaus control units (Tensionor) for web tension control on unwinding equipment are available.

Construction and installation

The brake should be arranged so that adequate ventilation is guaranteed. The brake should be accessible for maintenance (checking and replacing the brake pads).

Torque variations

The 4 brake sizes with variable, brake caliper numbers, effective piston area and friction material, give a wide range of torques with small increments.

Size	Coefficient of friction μ	Effective piston area %	Brake caliper Rated torque[1] in Nm at 6 bar 1	2	3	4	5	6
16	0,4	**100**	**9**	**18**	**27**	**36**	-	-
25	0,4[2]	100	140	280	420	560	-	-
		50	70	140	210	280	-	-
		25	35	70	105	140	-	-
	0,3	**100**	**100**	**200**	**300**	**400**	-	-
		50	50	100	150	200	-	-
		25	30	60	90	120	-	-
	0,15	**100**	**50**	**100**	**150**	**200**	-	-
		50	25	50	75	100	-	-
		25	15	30	45	60	-	-
34	0,4[2]	100	200	400	600	800	1000	1200
		50	100	200	300	400	500	600
		25	55	110	165	220	275	330
	0,3	**100**	**150**	**300**	**450**	**600**	**750**	**900**
		50	70	140	210	280	350	420
		25	40	80	120	160	200	240
	0,15	**100**	**75**	**150**	**225**	**300**	**375**	**450**
		50	35	70	105	140	175	210
		25	20	40	60	80	100	120
45	0,4[2]	100	300	600	900	1200	1500	1800
		50	135	270	405	540	675	810
		25	80	160	240	320	400	480
	0,3	**100**	**230**	**460**	**690**	**920**	**1150**	**1380**
		50	100	200	300	400	500	600
		25	60	120	180	240	300	360
	0,15	**100**	**115**	**230**	**345**	**460**	**575**	**690**
		50	50	100	150	200	250	300
		25	30	60	90	120	150	180

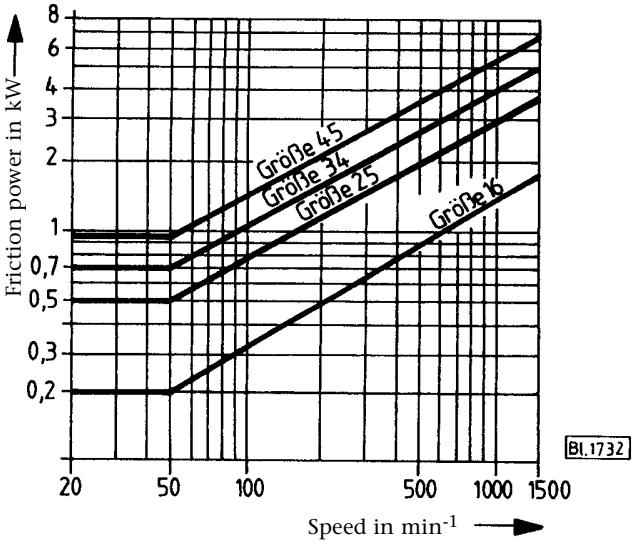
[1] The figures in bold face are standard designs.

[2] Coefficient of friction 0.4 in Sizes 25, 34, 45 for calipers switched on for emergency or fast stop.

Frictional power

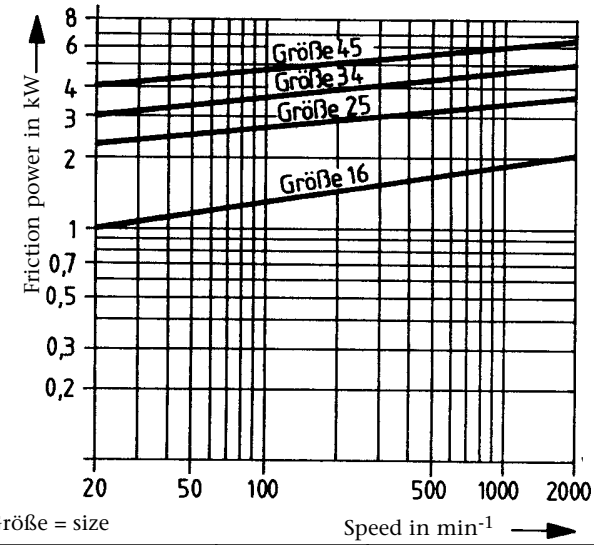
In unwinding processes the lowest speed (at maximum reel diameter) is the important one

Frictional power without forced ventilation



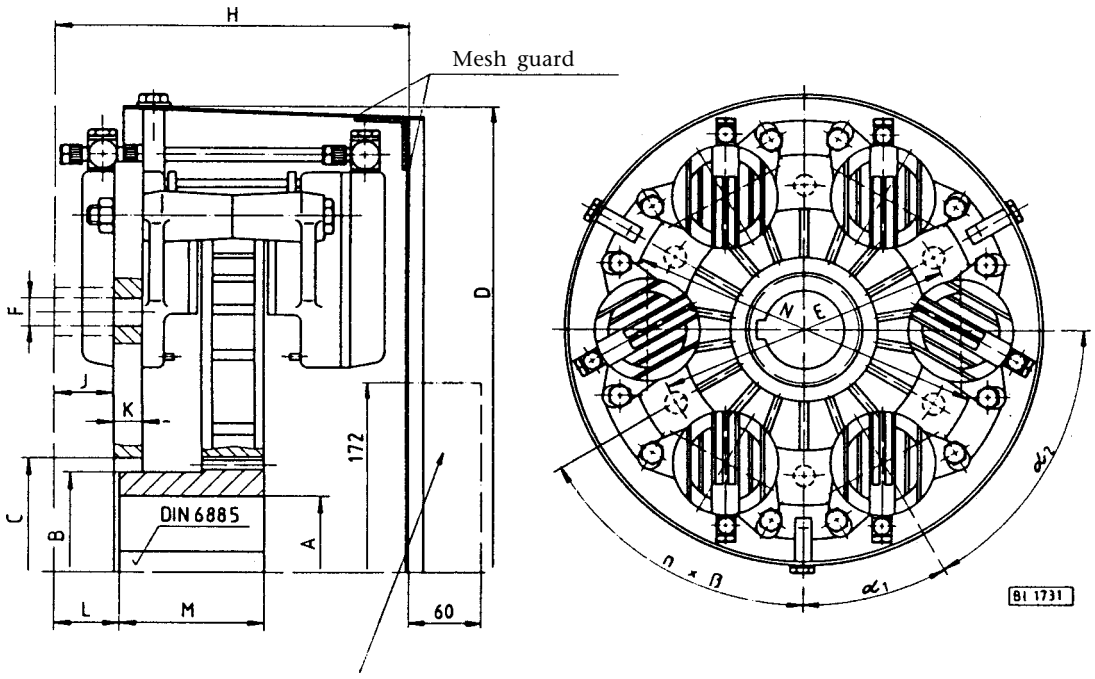
Avoid heat build-up due to enclosed installation.

Frictional power with forced ventilation



Größe = size

Dimensions



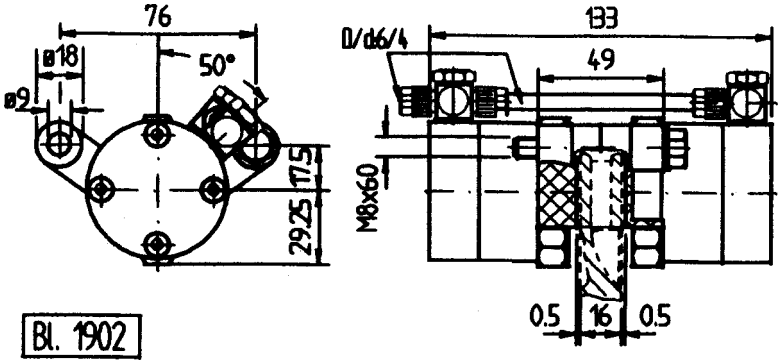
Fan (inside the mesh guard on size 34 and 45)

Series	n_{max}	Durchmesser								Längenmaße							
	min^{-1}	A_{min}	A_{max}	B	C^{H7}	D	E	F	N	H	J	K	L	M	α_1	α_2	n x ß
0454-...-16-... ...	4150	15	32	45,0	60	242	185	11	165	163	45	14	57	35	50°	90°	4 x 90°
0454-...-25-... ...	2600	20	55	74,4	75	360	203	13	250	165	21	19	42	55	45°	90°	4 x 90°
0454-...-34-... ...	1950	25	75	96,0	110	450	280	21	340	165	21	19	25	72	30°	60°	6 x 60°
0454-...-45-... ...	1450	40	90	115,0	180	560	375	21	450	165	21	19	23	74	30°	60°	6 x 60°

Volumetric capacity per brake caliper:
Size 16 new 3 cm^3 max 5,2 cm^3
Size 25 to 45 new 40 cm^3 max 80 cm^3

Design variations on request

Brake caliper, Build Size 16
(for brake discs Ø 160 mm)



BL. 1902

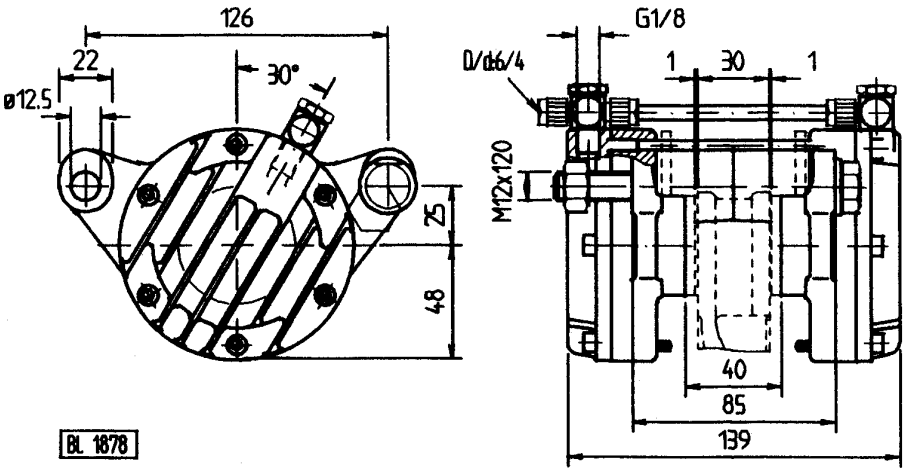
Effective area		cm^2 2,4
Swept volume	new max	cm^3 3,0 cm^3 5,2
Operating pressure	min max	bar 0,1 bar 6,0

0454-9 . 0-16-000 . 00

0 Without brake pad
4 With brake pad
Friction coefficient μ = 0,4

0 Without pneumatic fittings
2 With 1 T and 1 swivel fitting

Brake caliper, Build Size 34
(for brake discs Ø 250, 340 and 450 mm)



BL 1878

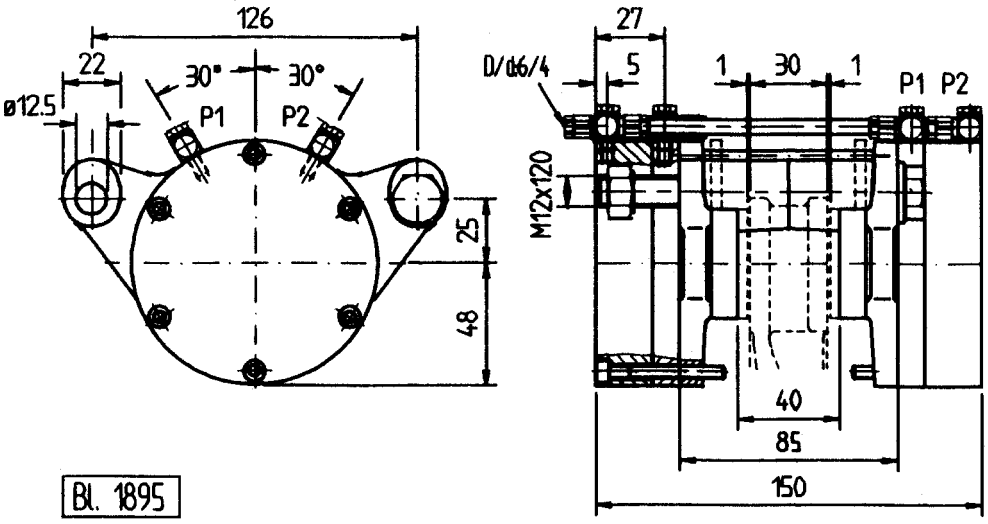
0454-9 . .-34-000 . . 0

0		Without brake pad
1		With brake pad μ 0,15
3		With brake pad μ 0,3
4		With brake pad μ 0,4
	0	Normal piston area
	1	Piston area reduced 50%
	2	Piston area reduced 75%

0		Without pneumatic fittings	
2		With 1 T and 1 swivel fitting	
	0	Without bracket	1454-541-34-010
	1	With bracket	(Page 7.08.00)

Brake caliper 0-454-			-9.0	-9.1	-9.2
Effective area		cm^2	30,4	14,2	8,3
Swept volume	new max	cm^3 cm^3	40 80	27 42	20 30
Operating pressure	min max	bar bar	0,1 6,0	0,1 6,0	0,1 6,0

2 stage brake caliper, Build Size 34
(for brake discs Ø 250, 340 and 450 mm)
First stage for controlled and regulated braking processes
Second stage for Fast Stop or Emergency braking processes



0454- 9 .3-34-000 .00

0	Without brake pad
1	With brake pad μ = 0,15
3	With brake pad μ = 0,3
4	With brake pad μ = 0,4

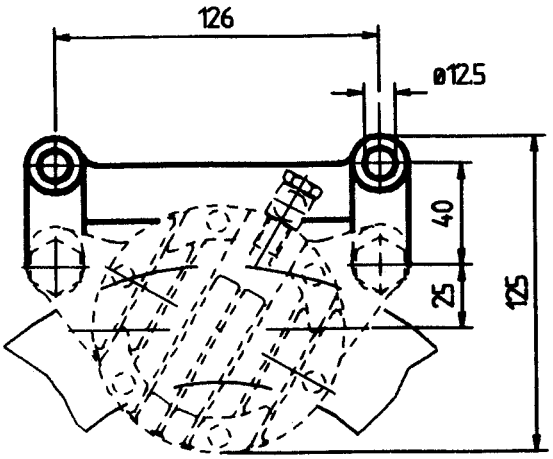
0	Without pneumatic fittings
2	With 1 T and 1 swivel fitting

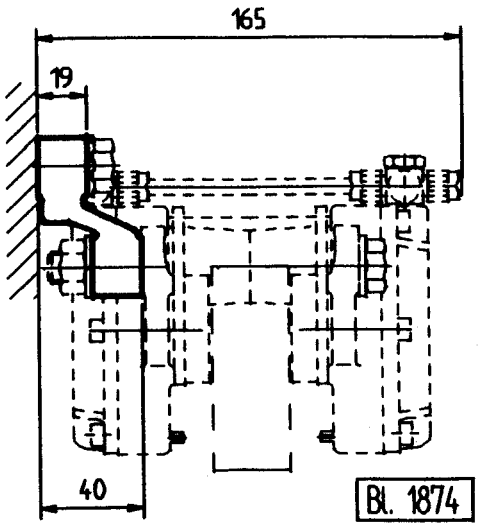
			Stage 1 (P1)	Stage 2 (P2)
Effective area		cm^2	30,4	32,5
Swept volume	new	cm^3	12	13
	max	cm^3	40	46
Operating pressure	min	bar	0,1	0,5
	max	bar	6,0	6,0

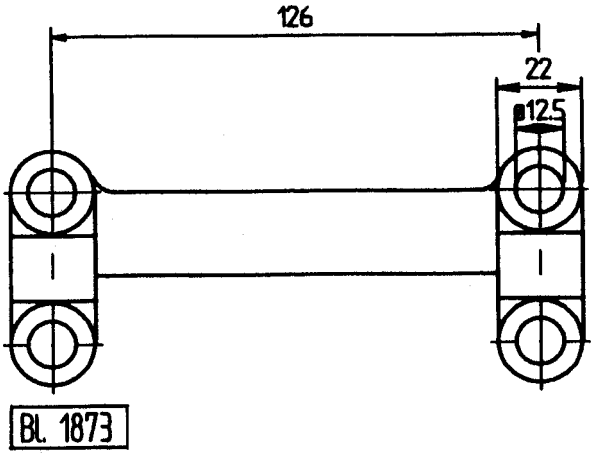
Bracket 1454-541-34-010

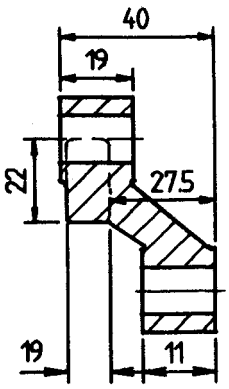
The bracket can be used to fix the brake caliper directly to the side of the machine. The flange on the tension brake can then be dispensed with.

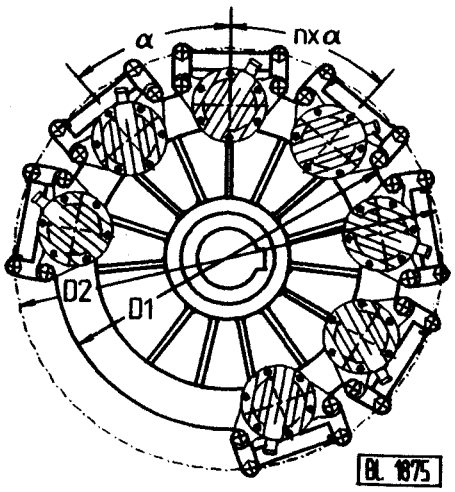
When using the bracket it is possible to arrange more brake callipers around the circumference of the brake disc than when using standard brakes with a flange (See Table).











In conjunction with brake discs

Brake disc Ø	D1	250	340	450
Possible number of brake calipers	n	5	7	9
Spacing	α	72°	51°	40°
Pitch circle Ø	D2	365	450	550

Axial fan 0087-035-00-003000

The fan is used for forced ventilation of the brake discs. On tension brakes it is fitted onto the protective grill of the brake as shown in Figure 2.

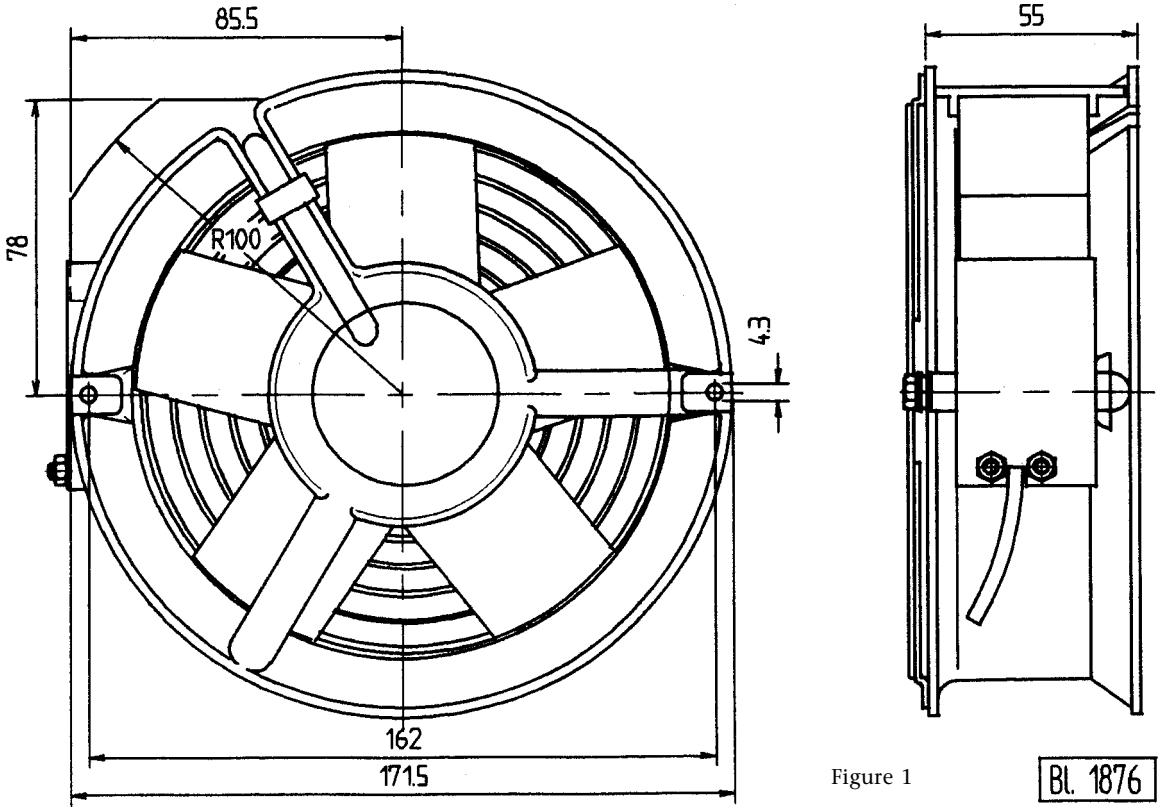
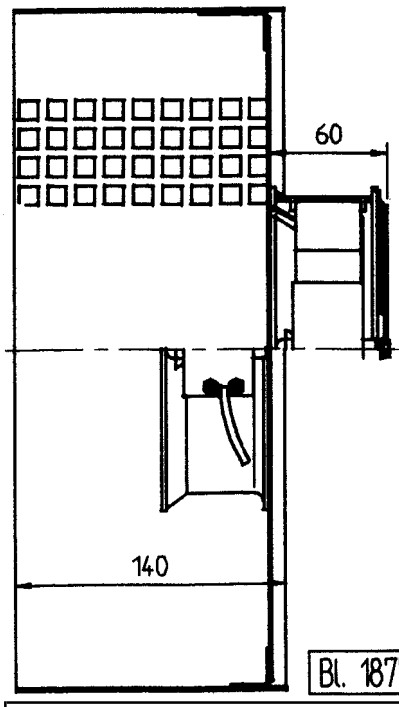


Figure 1

Max. volumetric flow	420 m^3/h
Electricity supply	230 V, 50 Hz
Power consumption	22 W
Cable with earthed plug	1.5 m



Fitting to the protective grill
on the series 0-454

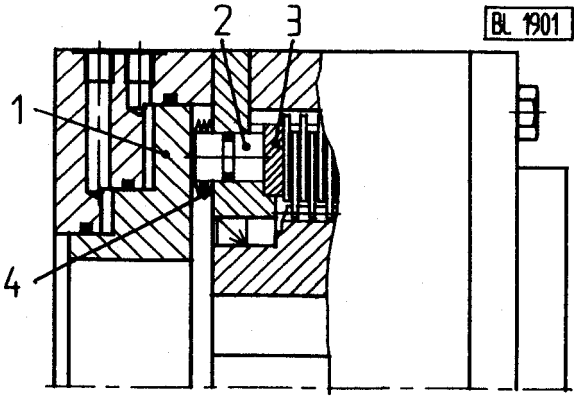
Size 16 and 25

Size 34 and 45

Figure 2

High power brake

Operation



The two stage piston (**1**) which is actuated by compressed air generates an axial load which is transferred to the plate pack through the pressure pin (**2**) and the pressure pad (**3**). The level of the braking torque is proportional to the braking pressure applied. After the brake pressure is removed the springs (**4**) push the pressure pin and the piston back to the starting position. The plate pack has cooling oil flowing through it during the braking process and this carries away any frictional heat generated.

Properties

Compared with air cooled dry running brakes, the wet- running oil cooled tension brakes on unwinding equipment offer the following advantages:

- Compact construction, an overall size of around 1/4 that of an air cooled brake.
- High thermal capacity due to oil circulation independent of the speed of the brake, low frictional surface temperature (Max 90^0 C).
- Low maintenance due to practically wear-free friction linings.
- No contamination of cooling air with abrasion dust, as this is a closed system.
- No noises due to squealing of the friction linings such as are possible with dry-running.
- Heat exchanger (oil/air - oil/water cooler) can be set up some distance from the machine (possibly in a separate room with a supply of fresh air). The power losses (frictional power) no longer have to be dissipated on the unwinding equipment.

Due to its design there is a residual torque in the brake. This depends on the speed, the quality of the cooling oil and the temperature (figures on request).

Installation

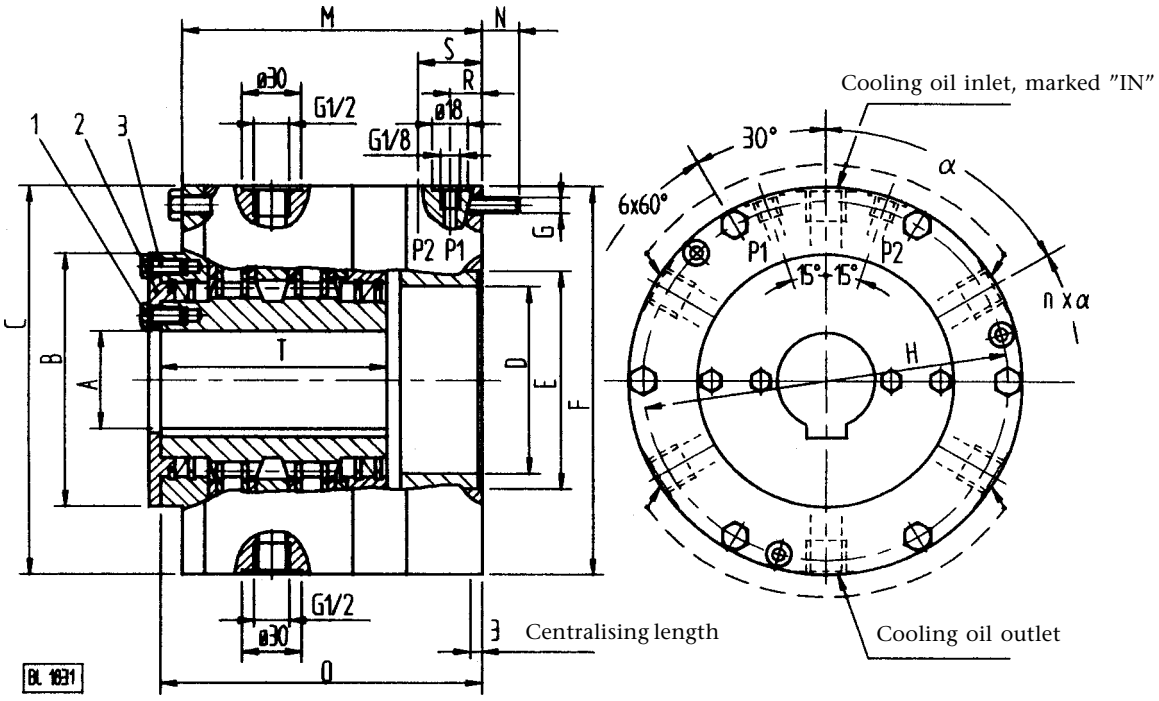
The brake is available in two variations:
Variation 1:
The brake is flange mounted and centralised on the bearing pedestal (machine stand).

Variation 2:
The brake is fitted onto the unwinding shaft and secured axially. A torque arm prevents the housing from turning. The torque arm, nuts and bolts must be ordered separately. Variation 2 is selected when it is not possible to centralise the brake on the machine stand.
The transfer of torque from the shaft to the internal drive hub can be either through a key and keyway or a locking assembly.

Cooling and lubrication materials

The friction characteristics of the wet-running high power brake depend largely on the oil quality selected. With unsuitable oils even at low speeds it is possible for chatter to occur in the brake. The oils used contain materials to prevent brake noises. Oils to the following specifications are suitable for use in high power brakes

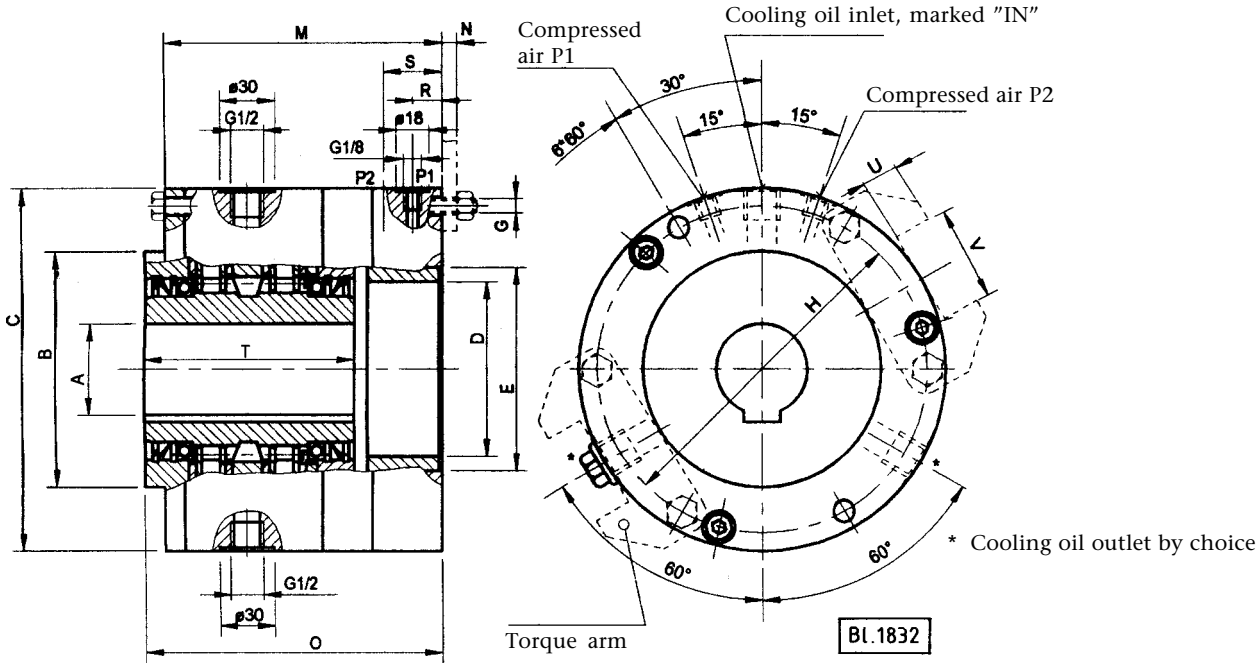
Automatic transmission fluids
ATF Type A, Suffix A



Series			0444-000-size-000000			
Size			**39**	**47**	**55**	**63**
Max. friction power		kW	9	14	32	45
Braking torque	Stage 1 (P1)	Nm	200	400	800	1400
	Stage 2 (P2)	Nm	600	1200	2400	4200
	Total	Nm	800	1600	3200	5600
Working pressure		bar	6	6	6	6
Diameter	A max H7		50	65	95	120
	B		130	155	180	230
	C		200	245	305	360
	D		95	98	110	140
	E		108	108	120	158
	F g7		200	245	305	360
	G		6 x M8	6 x M10	6 x M12	12 x M16
	H		185	225	282	335
	n		3	3	6	6
	α		120°	120°	60°	60°
Length dimensions	M		151	163	200,5	195
	N		19	17	20	25
	O		162	180	215	195
	R		15	15	14,5	15
	S		28	29	28,5	30
	T -0,2		119	132,8	162-0,3	135-0,3

After the brake has been fitted remove items 1, 2 and 3.

Cooling oil flow required can be provided on request



Series			0444-200-size-000000		
Size			**39**	**47**	**55**
Max. friction power		kW	9	14	32
Braking torque	Stage 1 (P1)	Nm	200	400	800
	Stage 2 (P2)	Nm	600	1200	2400
	Total	Nm	800	1600	3200
Working pressure		bar	6	6	6
Diameter	A max H7		50	65	95
	B		130	155	180
	C		200	245	305
	D		95	98	110
	E		108	108	120
	G		6 x M8	6 x M10	6 x M12
	H		185	225	282
Length dimensions	M		151	163	200,5
	N		19	17	20
	O		162	180	215
	R		15	15	14,5
	S		28	29	28,5
	T -0,2		119	132,8	162-0,3
	U		20	31	35
	V		51	80	90
Torque arm	1-444-541-size		000	000	
Hex. bolt	DIN 931		M8 x 170	M10 x 180	M12 x 220
	Grade		10.9	10.9	10,9
Hex. nut	DIN 943		M8 - 10	M10 - 10	M12-10

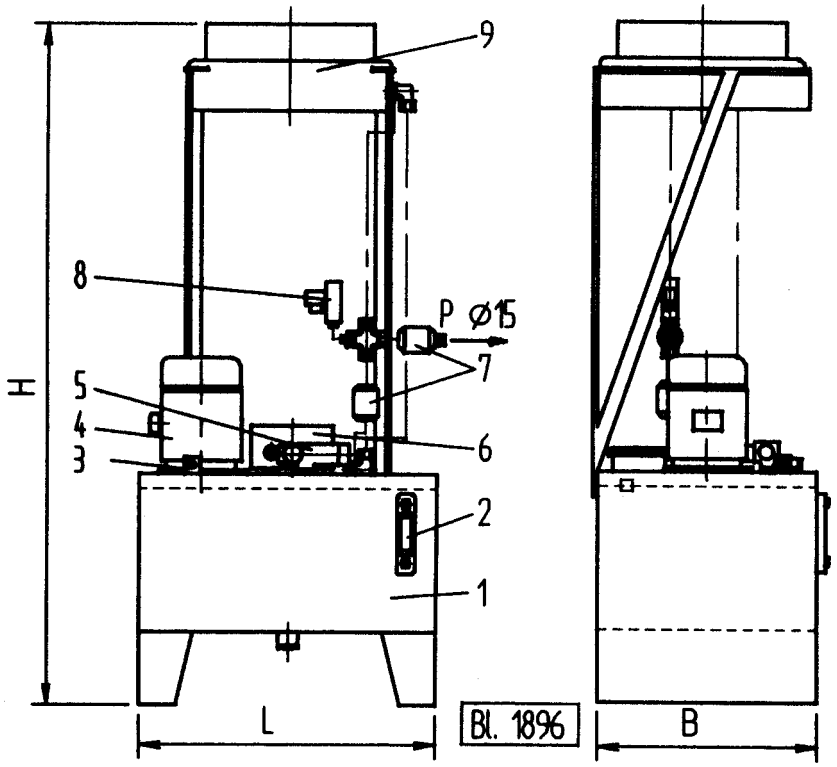
Cooling oil flow required can be provided on request

Hydraulic power pack with cooler

0086-237-..-...

Size	Cooling power[kW] with heat exchanger Oil/Air	Oil/Water	Pump power l/min	Tank volume l	Dimensions approx. ca. L x B x H mm
11	6	–	15	16	540 x 530 x 540
71	10	–	22	60	508 x 365 x 1200
82	16	40	40	115	633 x 460 x 1300
82	36	72	65	160	810 x 590 x 1300
96	–	130	160	400	1514 x 735 x 1700

Version with Oil/Air heat exchanger



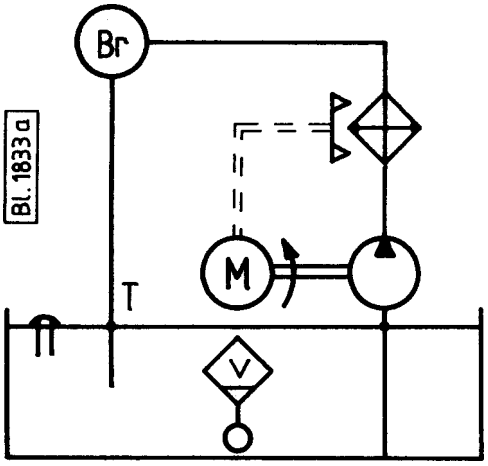
1 Tank
2 Oil level indicator
3 Level switch
4 Pump motor
5 Pressure relief valve
6 Temperature regulator
7 Throttle valve
8 Pressure switch
9 Oil cooler with blower motor

Cooling oil circuit

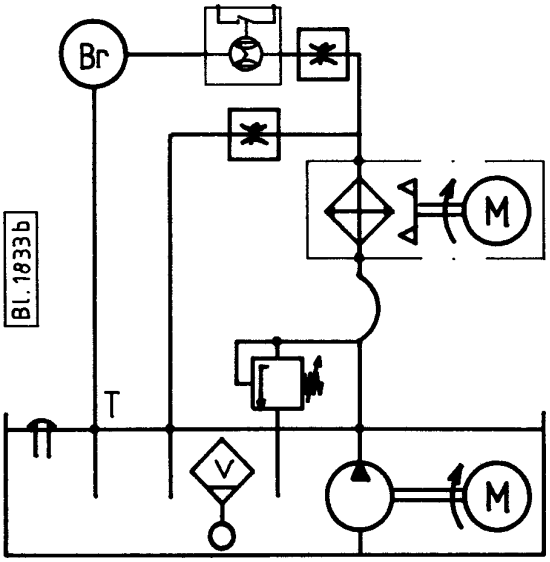
The cooling oil is directed through the disc pack of the brake where it absorbs the frictional heat which has been generated. The heated oil flows back into the tank. Cooling is carried out in an oil/air or oil/water heat exchanger. The return flow from the brake into the tank should be arranged with minimum backpressure so as to keep the dynamic pressure in the brake as low as possible. For this reason the heat-exchanger is fitted in the feed line. During continuous slipping operation the prescribed oil flow rate for cooling the brake must be ensured. The oil flow rate can be monitored with a flow meter and switch. If the minimum flow rate is not reached a signal will be triggered and the installation brought to a standstill.
Filtration of the cooling oil is not necessary for the brake, but is possibly required for the components used in the hydraulic power pack (e.g. changeover valves). Hydraulic power packs with oil/air or oil/water heat exchangers are part of the Ortlinghaus delivery range.

Design examples

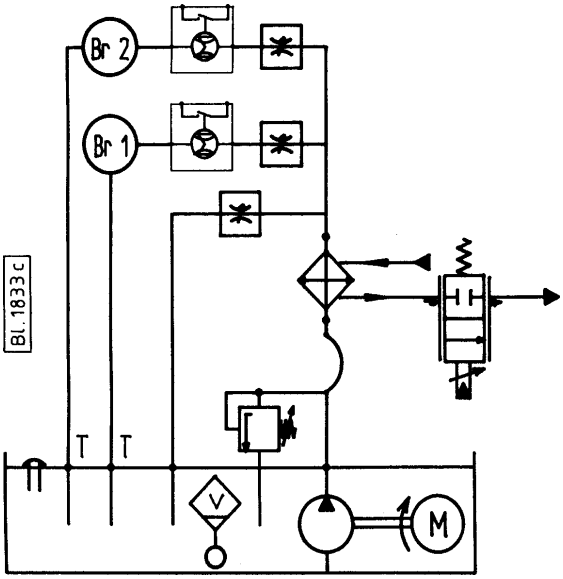
The following circuit diagrams show some examples of typical basic circuits. These can be varied and supplemented with additional monitoring or display functions.



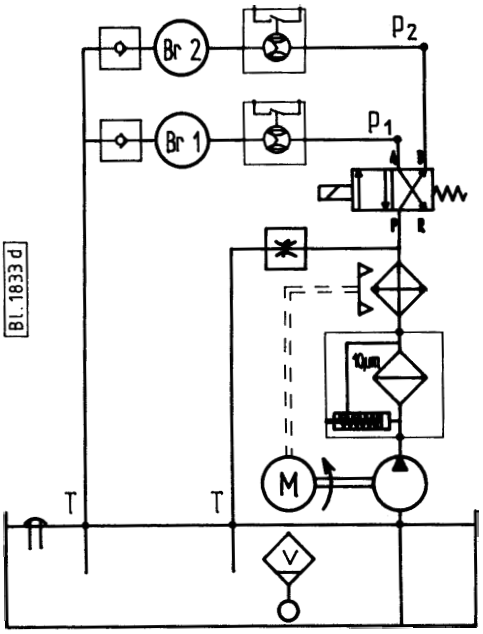
Example 1:
Circuit diagram for a brake with cooling power up to a maximum of 6 kW. Pump and blower are driven by one motor. Since the oil flow delivered by the pump flows through the heat exchanger and brake without being divided up no flow rate indicator is required. A simple, compact and good value design.



Example 2
The quantity of oil delivered by the pump is fed to the heat exchanger. After this the flow is split. Part of the flow goes directly back to tank, the rest flows as cooling oil through the brake. This circuit is best for cooling powers above 6 kW as at these powers the heat exchanger requires more oil flow than the brake can take. The oil flows are adjusted by throttle valves. Flow meters with switch contacts provide the displays and monitoring of the oil flow. Temperature controlled switching on and off of the fan motor is recommended.



Example 3:
Cooling oil supply for several brakes through a cooling unit with oil / water heat exchanger. The flow is split after it goes through the heat exchanger. The residual quantity which is not needed for the brake flows directly back to tank. Displaying and monitoring the adjusted oil flow rates is recommended. Oil/water heat exchangers provide a cost-effective alternative when industrial water supplies are available for cooling purposes.



Example 4:
Circuit diagram for two brakes which are fed alternately with cooling oil. For roll change-over machines the cooling oil flow is directed in each case to the active brake. This means that one cooling unit is adequate for two braked axles. A filter is provided to protect the directional control valve.

TENSIONOR I

Properties

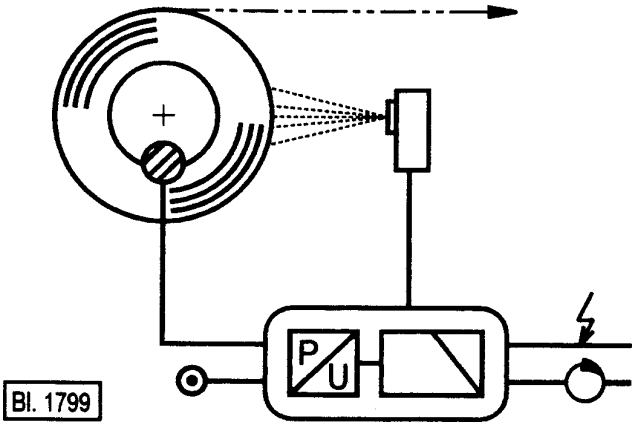
- Roll diameter is determined by ultrasonic sensor. No scanning with roll levers.
- Easy operation
- Digital display of operating parameters, additional control and monitoring for bleed function
- Easy retrofitting also possible for existing systems

Operation

The operating pressure of the brake or the „set-point“ is preselected according to the desired unrolling tension. The roll diameter is continuously determined by means of an ultrasonic sensor. The brake pressure is controlled depending on the roll diameter, so that the unwinding tension remains constant.
The control unit is operated with a membrane keypad and has a digital display as well as a signal output for an adjustable residual diameter.

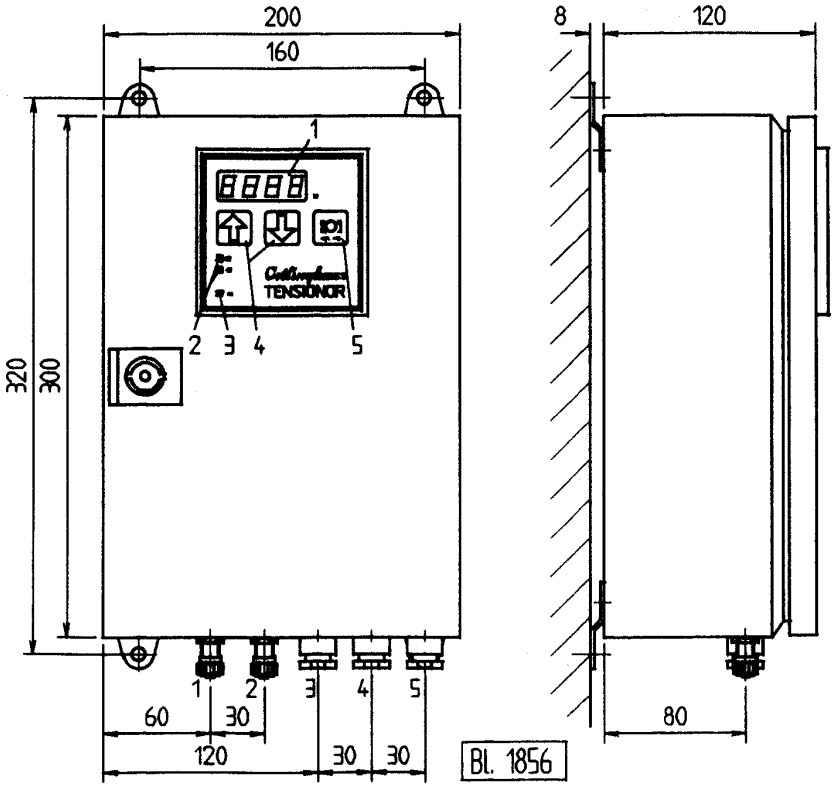
Area of application

- An alternative to present roller lever controls.
- Automation of present hand operated equipment. Also for multiple unwinding machines e.g. cross cutting machines.
- For continuous flow processes with no fast speed changes.
- Tension: whatever is required, depending on the braking torque available.
- Sensors for roll diameters up 1.170 mm



Operating panel 0087-454-21-015010

1 ultrasonic sensor 2087-670-11-010005 is included in the delivery specification



Operating controls

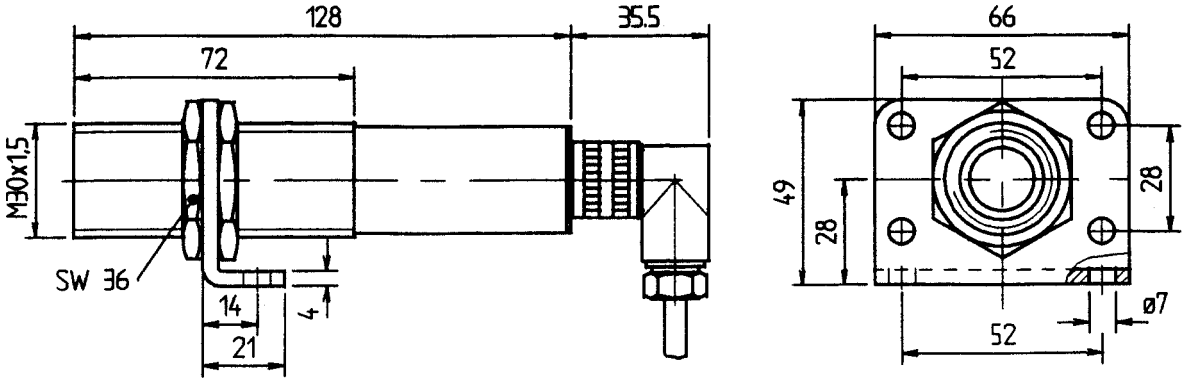
1 Digital display
2 LED - voltage supply
3 LED - ready for use
4 Button - Brake pressure adjustment
5 Button - Open brake

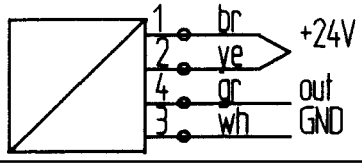
Technical data

Dimensions (W x H x T):	200 x 300 x 120mm
Supply line:	24 ±10% V DC, 1.2 A Residual ripple 10%
Mains pressure:	7 bar filtered 40 µm (NW4)
Output:	0-6 bar, (NW4)
Temperature range:	0-40° C

Ultrasonic sensor 2087-670-11-010005

Scanning range:	170 mm - 1170 mm
Supply voltage	24 ±10% V DC, Residual ripple 10%
Working temperature:	-20° C to +70° C
Output signal:	Bit pattern





Bl. 1857