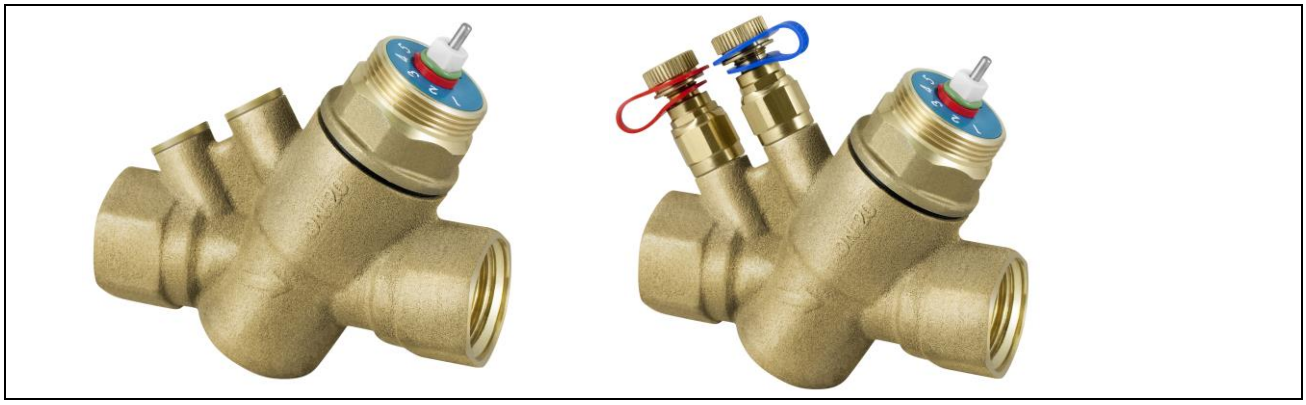
PRESSURE INDEPENDENT CONTROL VALVE

CT2873.1_02
EN
July 2018



PRODUCTION RANGE

	Code	Size	DP (kPa)	flow rate (m^3/h)	Cartridge colour
Version without pressure plugs 	2873.04.50	1/2"	16 ÷ 200	0,037 ÷ 0,575	Grey o-ring
	2873.04.60	1/2"	30 ÷ 400	0,064 ÷ 1,110	Black o-ring
	2873.05.50	3/4"	16 ÷ 200	0,037 ÷ 0,575	Grey o-ring
	2873.05.60	3/4"	30 ÷ 400	0,064 ÷ 1,110	Black o-ring
	2873.06.50	1"	16 ÷ 200	0,037 ÷ 0,575	Grey o-ring
	2873.06.60	1"	30 ÷ 400	0,064 ÷ 1,110	Black o-ring
Version with pressure plugs 	2874.04.50	1/2"	16 ÷ 200	0,037 ÷ 0,575	Grey o-ring
	2874.04.60	1/2"	30 ÷ 400	0,064 ÷ 1,110	Black o-ring
	2874.05.50	3/4"	16 ÷ 200	0,037 ÷ 0,575	Grey o-ring
	2874.05.60	3/4"	30 ÷ 400	0,064 ÷ 1,110	Black o-ring
	2874.06.50	1"	16 ÷ 200	0,037 ÷ 0,575	Grey o-ring
	2874.06.60	1"	30 ÷ 400	0,064 ÷ 1,110	Black o-ring

ACCESSORIES

Code		
2961.00.02		Spanner for cartridge adjustment. It allows adjusting the flow rate to the desired value by acting on the cartridge.
2882.00.02 (24V AC 0…10V) 2882.00.12 (110-230V AC 3 points) 2882.00.22 (24V AC 3 points)		Electrical motor. Complete with ring nut clamping to valve body and electric power cable. Power supply 24/230V
2881.00.12 (24V AC/DC) 2881.00.22 (230V AC)		Thermo-electric motor. Complete with ring nut clamping to valve body and electric power cable. Power supply 24/230V
621.01.50		Pressure plugs (size 1/8") to be prearranged on the pressure independent control valves, should the latter be also used for indirectly reading the passing-through flow rate Accessory supplied for 2874 models as standard.
932.01.00		Pair of needle adapters for pressure measurement. Used to connect pressure plugs code 621.01.50 to digital measuring instrument code 3566.00.00
3566.00.00		Electronic differential pressure measuring instrument suitable for the direct reading of flow rate and pressure values on water circuits. Battery power supply, complete with case and kits for connection to pressure test ports.

SPARE PARTS

8455.005		**Grey** o-ring cartridge**.**	Flow rate range **0.037 ÷ 0.575 m^3/h**
8455.055		**Black** o-ring cartridge**.**	Flow rate range **0.064 ÷ 1.110 m^3/h**

DESCRIPTION

The pressure independent control valve **allows adjusting and keeping the flow rate constant to the desired value, within a wide differential pressure range upstream and downstream**.

Therefore, it encloses the functions of a **flow rate stabiliser** and a **control valve** in a single product.

The flow rate value is adjusted in the following ways:

- Through a cartridge adjustable from outside (manual operation to be carried out using a special accessory spanner) so as to limit the maximum set value.
- Through an electrothermal or electrical motor (automatic operation) according to the thermal loads required by the system.

During these operations/adjustments the valve does not need to be shut off.

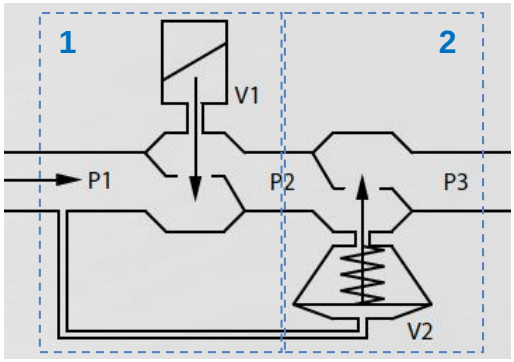
THE PURPOSE:
Inserted in hydraulic circuits, the pressure independent control valve **ensures preserving the design flow rate while modulating it according to the circuit thermal requirements.**

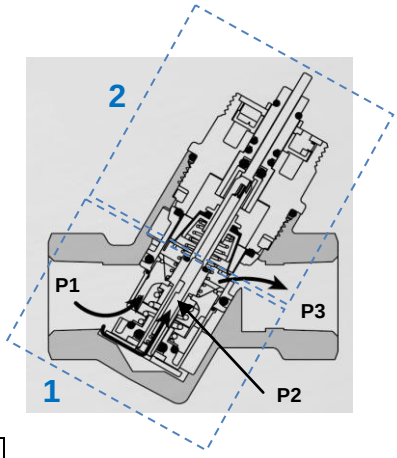
USE:
It is particularly indicated in the following cases:

- Adjustment for pumping stations in central thermal fluid systems.
- Terminal balancing and adjustment on customer junctions.
- Third way adjustment and balancing on thermoregulation units.

CHOICE:
It is advisable to choose the pressure independent control valve, the pressure adjustment degree corresponding to about half the cartridge flow rate range.
In this way, with the design nominal flow rate, a sufficient calibration margin is preserved so as to cope with any corrections due to inevitable route changes during work. NOTE: For differential pressure measurement, pressure test ports are supplied as standard **only** for model 2874 valves.

OPERATING PRINCIPLE:
Pressure P2 is determined by the membrane reacting to pressure P1 acting on the membrane upper chamber.
Interacting with the spring, the difference (P1-P2) remains constant, while maintaining a steady ΔP through the orifice.
As a result, a **constant flow rate through the valve is obtained regardless of variations in the pressure difference** between upstream and downstream, which **can be adjusted by the motor depending on the system thermal requirements**.

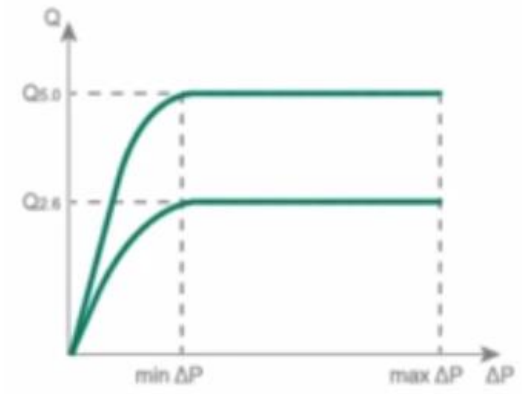




KEY:

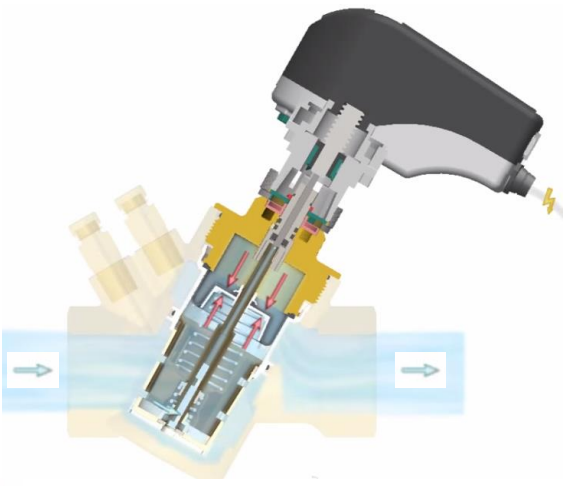
1 Control device ΔP
2 Flow rate adjustment device
P1 and **P3**: Circuit pressure values
P2: Pressure determined by membrane
ΔP = (P1-P3) = Total pressure difference between upstream/downstream

OPERATING FIELD:
In order to ensure the valve proper operation (maintain a constant flow rate under differential pressure varying conditions), it is necessary that **ΔP** is within the DP allowed range (max. 200 kPa grey o-ring cartridge, or max. 400 kPa, black o-ring cartridge).



16÷30 kPa 200÷400 kPa

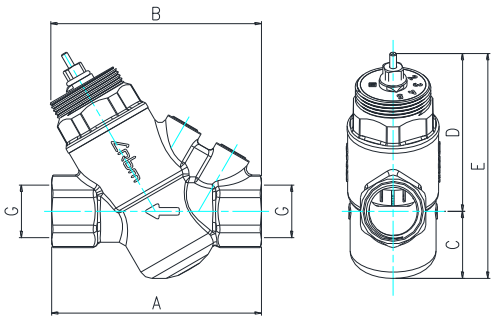
To sum up, device **1** controls and maintains ΔP constant, while device **2** modulates the flow rate according to the circuit thermal requirements.

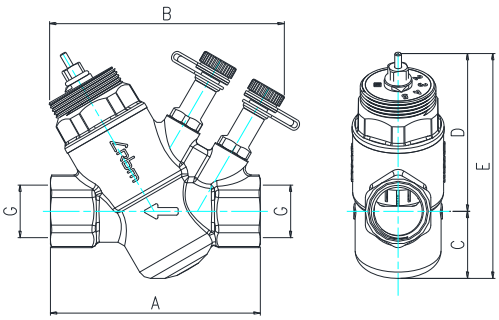


Indicates the flow direction.

Indicates pressure variations.

DIMENSIONAL FEATURES



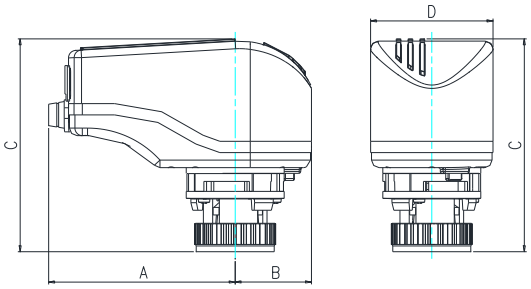


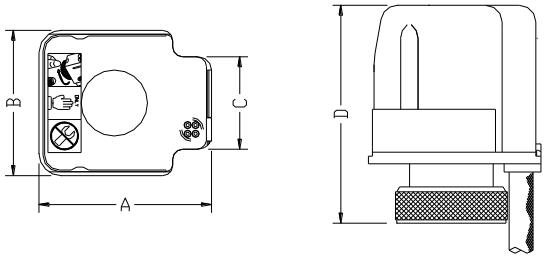
Valve without pressure plugs (series 2873)

Code	Size G	A [mm]	B [mm]	C mm	D [mm]	E [mm]
2873.04.X0	1/2"	83	83,6	26,6	63,1	89,7
2873.05.X0	3/4"	95,1	89,6	26,6	63,1	89,7
2873.06.X0	1"	102	93,7	26,6	63,1	89,7

Valve with pressure plugs (series 2874)

Code	Size G	A [mm]	B [mm]	C mm	D [mm]	E [mm]
2874.04.X0	1/2"	83	93	26,6	63,1	89,7
2874.05.X0	3/4"	95,1	94,8	26,6	63,1	89,7
2874.06.X0	1"	102	89,5	26,6	63,1	89,7





Electrical motor (series 2882)

Code	A [mm]	B [mm]	C mm	D [mm]
2882.00.X2	78,6	32,1	89,7	51,6

Thermo-electric motor (series 2881)

Code	A [mm]	B [mm]	C mm	D [mm]
2881.00.X2	52	44	28	60

CONSTRUCTION FEATURES

VALVE:

Body	: Brass
Cartridge	: Polymer with EPDM membrane
Indicator with graduated scale	
Threaded connections	: FF UNI-EN-ISO 228
Pressure plug connections	: G1/8"
motor connections	: M30x1.5

TECHNICAL FEATURES

VALVE:

Max. operating pressure	: 16 bar (1600 kPa)
Operating temperature range	: - 20 ÷ +120°C
Fluid	: Water and Water+Glycol 50%
Adjustment partition no.	: Refer to the table on page

MOTOR:

Power supply:	: 24/230 V
Consumption	: 5 W (series 2882) 2.5 W (series 2881)
Frequency	: 50 Hz
Electrical protection	: IP 54
Cable length	: 1 m

FLOW RATE ADJUSTMENT

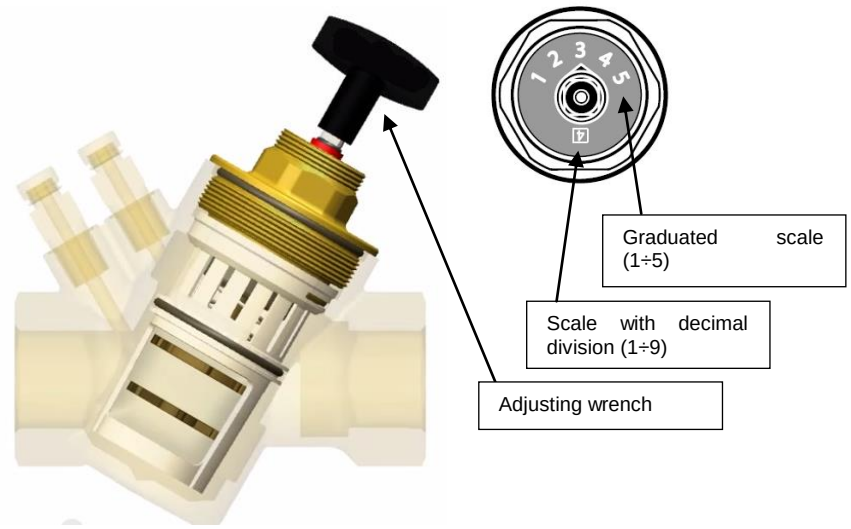
The flow rate value is limited through a cartridge adjustable from outside using a special accessory spanner code 2961.00.02

The adjustment value is readable through the double indicator on the cartridge:
- Graduated scale
- Scale with decimal division.

When adjusting the flow rate, the valve does not need to be shut off.

In order to realize the regulation it is necessary to proceed with a complete cartridge closure (position 1,0) and later open the same cartridge up till the desired value.

Depending on the flow rate range, 2 different types of cartridges are available. With regard to this, please see the "SPARE PARTS" section on this data sheet.



FLOW RATE ADJUSTMENT TABLES

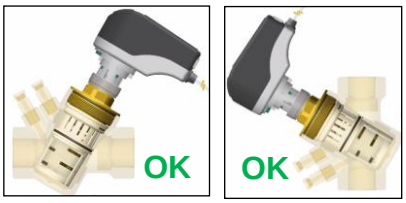
rpm Adjustment	Cartridge **Grey o-ring** (code 8455.005) ΔP range 16÷200 kPa l/h	Cartridge **Black o-ring** (code 8455.055) ΔP range 30÷400 kPa l/h
1,0	-	64
1,1	37	142
1,2	84	209
1,3	116	268
1,4	151	319
1,5	180	366
1,6	205	408
1,7	234	446
1,8	259	482
1,9	281	516
2,0	302	549
2,1	320	580
2,2	339	611
2,3	353	641
2,4	371	671
2,5	281	700
2,6	394	728
2,7	406	756
2,8	414	783
2,9	428	810
3,0	439	835
3,1	449	860
3,2	458	883
3,3	468	906
3,4	477	927
3,5	486	946
3,6	494	965
3,7	503	982
3,8	511	998
3,9	518	1010
4,0	526	1020
4,1	532	1040
4,2	538	1050
4,3	544	1060
4,4	549	1070
4,5	553	1080
4,6	559	1080
4,7	563	1090
4,8	567	1100
4,9	571	1100
5,0	575	1110

Tolerance: bigger value between ± 10% of the imposed flow rate and ± 5% of the maximum flow rate.
Example: taking in examination the cartridge code 8455.005, regulated at 2,3 rotation (imposed flow rate 353 l/h) the tolerance to be considered is equal to the bigger value between ± 10% of 353 l/h (35,3 l/h) and ± 5% of 575 l/h (28,75 l/h). Therefore in this case the tolerance to be considered is ±35,3 l/h.

INSTALLATION TIPS

When installing the RBM pressure independent control valve, it is recommended to comply with the following requirements:

- The pressure independent control valve can be installed either on vertical or horizontal pipes. For further installation specifications please refer to the instructions of the motor in use.



- Note: the flow direction according to the indication on the valve body.

- Arrange to install a strainer upstream of the pressure independent control valve (mesh size for the strainer minimum 800 µm). Should this not be feasible in horizontal paths and in order to prevent hardly removable sludges and impurities from densifying, the pressure test ports connections should be <u>always</u> oriented in such a way as to be positioned upwards during installation.

MOTOR INSTALLATION

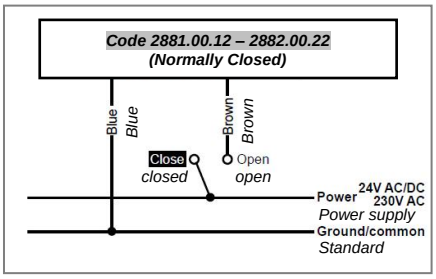
The installation of the motor does not require the use of tools for tightening the ring nut on the valve body. Hand tightening.

<u>WARNINGS:</u> The installation must be done *only by professionally qualified* personnel, in compliance with applicable laws and regulations.

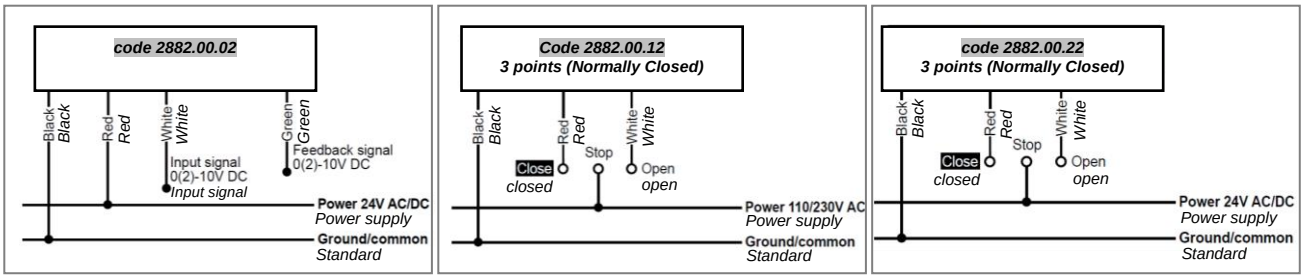
During the electrical and hydraulic connections, make sure that both the water supply line and the power supply mains have been disconnected.

<u>The electrical connections shown have the sole purpose of providing the technician with a quick reference for electrically connecting the whole system. The electrical connections shown are not binding and therefore do not represent the performance limits of the components.</u>

- **<u>MOTOR WIRING DIAGRAMS, ELECTROTHERMAL MODEL:</u>**



- **<u>MOTOT WIRING DIAGRAMS, ELECTRICAL MODEL:</u>**



POSSIBLE APPLICATIONS

Pressure independent control valves are mainly used on the hydraulic circuit **return pipe**. Below are some typical application examples:

Fig. 1

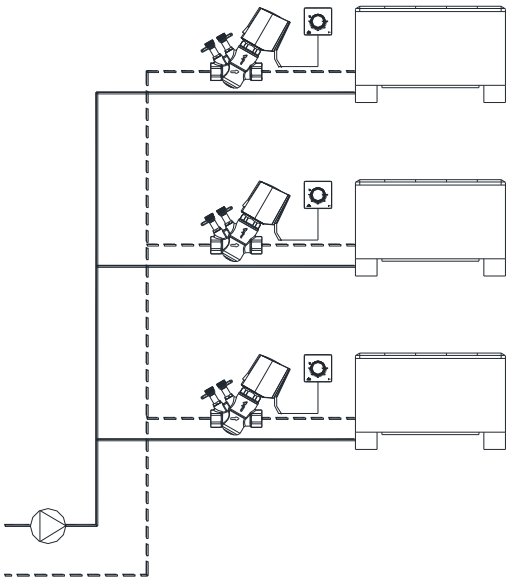


Fig. 2

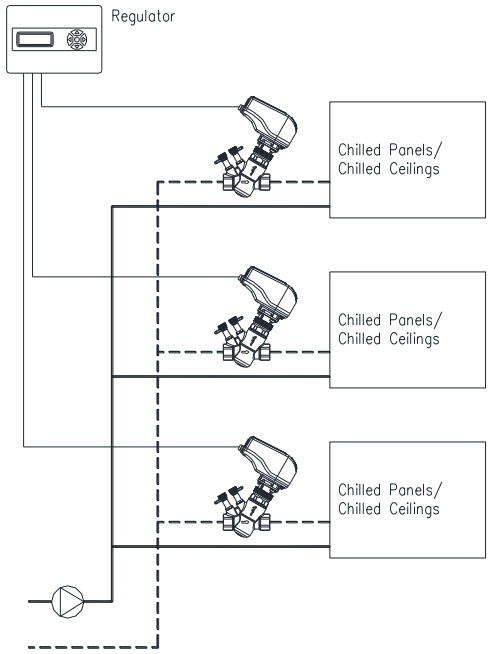


Figure 1 - Pressure independent control valve with the function of serving in-line terminal elements (radiators, convectors, fan-coils, etc.). Each valve provided with an thermo-electric motor is controlled by a thermostat/chronothermostat.

Figure 2 - Pressure independent control valve with the function of serving terminal elements (chilled panels, chilled beams, etc.). Each valve provided with an electrical motor is managed by a controller (signal 0÷10V / 230V / 24V)**.**

SPECIFICATION ITEMS

SERIES 2873

Pressure independent control valve with cartridge adjustable from outside, prearranged for the insertion of pressure plugs for flow rate indirect reading. Connection for motor series 2881 and 2882 M30X1.5. Brass body. Polymer cartridge with EPDM membrane. Indicator with graduated scale. Threaded connections FF UNI-EN-ISO 228. Max operating pressure 16 bar. Allowed temperatures from -20 to +120°C. Allowed fluid water and water + glycol 50%. Pressure gauge plugs connection G 1/8". Available sizes 1/2" ÷ 1". Work field 16÷200 kPa (or 30÷400 kPa). Available flow rate field from 0.037 to 1.11 m^3/h.

SERIES 2874

Pressure independent control valve with cartridge adjustable from outside, provided with pressure plugs for flow rate indirect reading. Connection for motor series 2881 and 2882 M30X1.5. Brass body. Polymer cartridge with EPDM membrane. Indicator with graduated scale. Threaded connections FF UNI-EN-ISO 228. Max operating pressure 16 bar. Allowed temperatures from -20 to +120°C. Allowed fluid water and water + glycol 50%. Pressure gauge plugs connection G 1/8". Available sizes 1/2" ÷ 1". Work field 16÷200 kPa (or 30÷400 kPa). Available flow rate field from 0.037 to 1.11 m^3/h.

SERIES 2961

Spanner for cartridge adjustment. It allows adjusting the flow rate to the desired value by acting on the cartridge.

SERIES 2882

Electrical motor, complete with ring nut clamping to valve body and electric power cable. Power supply 24V (or 230V). Consumption 5W. Frequency 50 Hz. Electric protection IP54. Cable length 1m. Connection ring nut M30x1.5.

SERIES 2881

Thermo-electric motor complete with ring nut clamping to valve body and electric power cable. Power supply 24V (or 230V). Consumption 2.5W. Frequency 50 Hz. Electric protection IP54. Cable length 1m. Nominal thrust 170N. Connection ring nut M30x1.5.

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