

**3-WAY CONTROL VALVE G3FMT – ULL/SL & MULL/SLM
ULTRA LOW LEAKAGE AND STANDARD LEKAGE
(LEFT, RIGHT, MIDDLE)**

INSTRUCTION

NO.: 99.225.01 A
DATE: OCT. 2023

APPROVAL: DRAFT

Clorius
CONTROLS

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

General safety instruction

The valves must be installed and serviced by fully trained and qualified personnel only, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger.

Warning information



This warning box features a yellow background. At the top, there are three black icons: a warning triangle with an exclamation mark, a person wearing safety goggles, and a pair of work gloves. Below the icons, the text reads: **Warning!** Media can be hot and cause burning. Do use safety goggles and gloves.



This warning box features a yellow background. At the top, there are three black icons: a warning triangle with an exclamation mark, a person wearing safety goggles, and a pair of work gloves. Below the icons, the text reads: **Warning!** Wrong installation can result in several damage or that the valve is not functioning correctly. These general instructions do not cover all possible operating scenarios. For a more specific guidance about the usage of the valve or its qualification at the desired use, please contact BROEN.

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

CONTENT

This manual is valid for following valve types:

3-way control valve type:

G3FMT-ULL (Left & Right) – G3FMT-MULL (Middle)

G3FMT-SL (Left & Right) – G3FMT- SLM (Middle)

DESCRIPTION	Page
1. Safety and warning information	2
2. General information	
- Application	
- Design	4
- Function	
- Features	
3. Technical Data	5
- Table 1: KvS, Torque, Weight	6 & 7
- Table 2: Dimensions Valves	8, 9 10
- Table 3: Dimensions Flanges	11
4. Installation & Commissioning	
- Installation and port direction	12,13
- Installation & Commissioning	14
5. Operation and maintenance	14
6. Maintenance Schedule	14
7. Spare parts	
- Packing set for 3 way control valve DN100-400 G3FMT-ULL	15
- Packing set 3 way control valve DN100-250 G3FMT-SL(Standard Flow)	16
- Packing set 3 way control valve DN300-400 G3FMT-SL (Standard Flow)	17
8. Transport and storage	18
9. Related documentation	19
10. Contacts	20

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

2. General information Applications

Control valves type G3FMT-ULL, MULL & SL, SLM are a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large

water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

Design

The valve body and the valve slide are made of nodular cast iron.

The valve flanges are drilled according to EN 1092-2 – option JIS B 2210 5K/10K and ANSI class 150.

Function

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

The valve has a small tolerance between body and slide.

PTFE sealing element and O-ring are mounted in the slider groove to minimize leakage

Features

- Simple design secures reliable controls and reduces costly downtime
- Ultra Low Leakage rate secures energy savings - Best in class
- Most compact valve on the market
- Full flexibility on port orientation

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data

Technical data	
Valve type	Valve size
Ultra low leakage ULL & Standard leakage SL (Left & right)	DN100, DN100 (*HF)
	DN125, 150
	DN200, 250
	DN300 (**RF), 300
	DN350, 400
Ultra low leakage ULLM & Standard leakage SLM (Middle)	DN100, DN100 (*HF)
	DN125, 150
	DN200, 250
*High Flow *** Raised face	

Technical data	
Valve design	Almost linear
Materials	
- Valve body	Nodular cast iron EN-GJS-400-15
- Slide	Nodular cast iron EN-GJS-400-15
- Sealing	Silicone
- O-ring	PTFE
Leakage rate (ULL - MULL)	ANSI class IV/EN 1349 < 0.01%
Leakage rate (SL - SLM)	ANSI class I
Flanges	EN 1092-2 PN 10
Option	JIS B 2210 5K/10K
	ANSI class 150
Max. pressure Δp, against which the valve can close	5 bar
Nominal pressure	PN10
Design temperature	120°C
Optional temperature	150°C (ONLY FOR ULL/MULL)

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data

TABLE 1: G3FMT-ULL Left & Right (Ultra low leakage)				
Type	Flange connection DN	KvS m ³ /h	Torque Nm For inlet p _∞	Weight kg
DN100 (*HF)	100	232	40	27.9
DN125	125	232	40	34
DN150	150	370	90	42
DN200	200	680	120	67
DN250	250	1.055	150	95
DN300 (**RF)	300	1.030	150	140
DN300	300	1.750	320	130
DN350	350	2.500	418	175
DN400	400	3.170	530	220

TABLE 1: G3FMT-MULL Middle (Ultra low leakage)				
Type	Flange connection DN	KvS m ³ /h	Torque Nm For inlet p _∞	Weight kg
DN100 (*HF)	100	179	40	27
DN125	125	179	40	36
DN150	150	310	90	44,5
DN200	200	550	120	71
DN250	250	830	150	102

∞Torque calculated for max ΔP for DN100-300 – 5bar

All dimension in mm

* High flow

**Long version

***Reduced flow

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data

TABLE 1: G3FMT-SL Left & Right (Standard leakage)				
Type	Flange connection DN	KvS m ³ /h	Torque Nm For inlet p _∞	Weight kg
DN100 (*HF)	100	232	40	27.9
DN125	125	232	40	34
DN150	150	370	45	42
DN200	200	680	90	67
DN250	250	1.055	115	95
DN300 (**RF)	300	1.030	115	140
DN300	300	1.750	160	130
DN350	350	2.500	210	175
DN400	400	3.170	265	220

TABLE 1: G3FMT-SL Middle (Standard leakage)				
Type	Flange connection DN	KvS m ³ /h	Torque Nm For inlet p _∞	Weight kg
DN100 (*HF)	100	179	40	27.9
DN125	125	179	40	36
DN150	150	310	45	44,5
DN200	200	550	90	71
DN250	250	830	115	102

∞Torque calculated for max ΔP for DN100-300 – 5bar

All dimension in mm

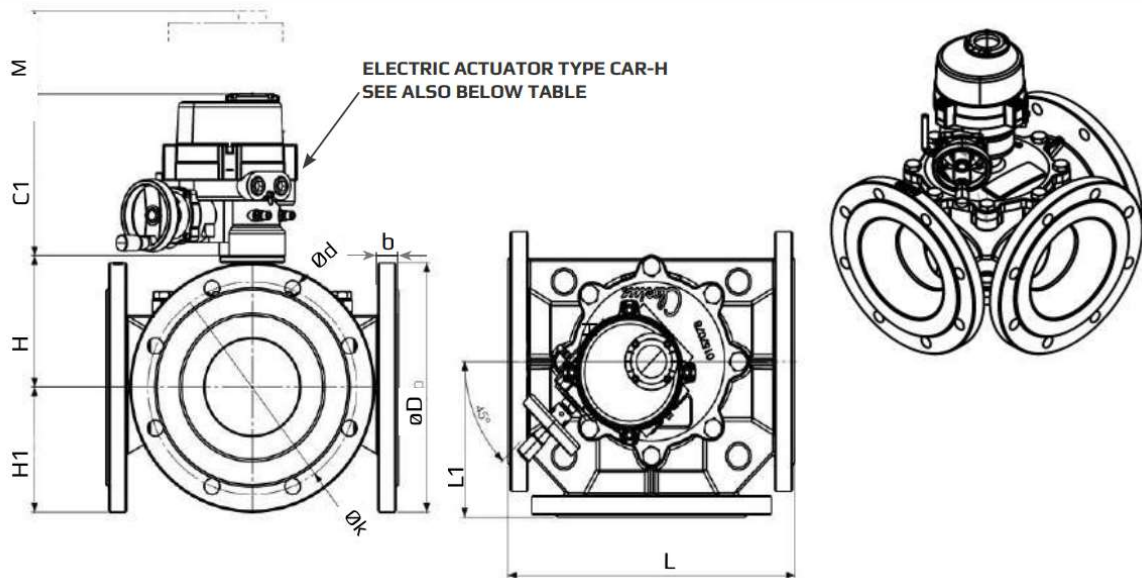
* High flow

**Long version

***Reduced flow

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data



**TABLE 2 DIMENSION
G3FMT-ULL Left & Right (Ultra low leakage)**

Type	L	L1	H	H1	B	C	M	ELECTRIC ACTUATOR TYPE CAR-H
DN100 (*HF)	296	148	140	ØD/2	24	223	110	CAR-H 006/010
DN125	330	165	140	ØD/2	24	223	110	CAR-H 006/010
DN125 (JIS5K)	320	160	140	ØD/2	19	223	110	CAR-H 006/010
DN150	356	178	149	ØD/2	25,4	223	110	CAR-H 006/010
DN200	410	205	182	ØD/2	28,4	261	150	CAR-H 016
DN200 (**L)	484	242	182	ØD/2	28,4	261	150	CAR-H 016
DN250	480	240	202	ØD/2	31	261	150	CAR-H 016
DN300 (**RF)	580	290	202	ØD/2	32	261	150	CAR-H 010
DN300	560	280	237	ØD/2	32	315	180	CAR-H 035
DN350	660	330	256	ØD/2	36	315	180	CAR-H 050
DN400	720	360	278	ØD/2	38	315	180	CAR-H 050

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data

TABLE 2 DIMENSION G3FMT-MULL Middle (Ultra low leakage)								
Type	L	L1	H	H1	B	C	M	ELECTRIC ACTUATOR TYPE CAR-H
DN100 (*HF)	296	148	140	ØD/2	24	223	110	CAR-H 006/010
DN125	330	165	140	ØD/2	24	223	110	CAR-H 006/010
DN125 (JIS5K)	320	160	140	ØD/2	19	223	110	CAR-H 006/010
DN150	356	178	149	ØD/2	25,4	223	110	CAR-H 006/016
DN200	410	205	182	ØD/2	28,4	261	150	CAR-H 016
DN200 (**L)	484	242	182	ØD/2	28,4	261	150	CAR-H 016
DN250	480	240	202	ØD/2	31	261	150	CAR-H 020

TABLE 2 DIMENSION G3FMT-SL Left & Right (Standard leakage)								
Type	L	L1	H	H1	B	C	M	ELECTRIC ACTUATOR TYPE CAR-H
DN100 (*HF)	296	148	140	ØD/2	24	223	110	CAR-H 006
DN125	330	165	140	ØD/2	24	223	110	CAR-H 006
DN125 (JIS5K)	320	160	140	ØD/2	19	223	110	CAR-H 006
DN150	356	178	149	ØD/2	25,4	223	110	CAR-H 006
DN200	410	205	182	ØD/2	28,4	223	110	CAR-H 010
DN200 (**L)	484	242	182	ØD/2	28,4	223	110	CAR-H 010
DN250	480	240	202	ØD/2	31	223	110	CAR-H 010
DN300 (**RF)	580	290	202	ØD/2	32	261	110	CAR-H 010
DN300	560	280	237	ØD/2	32	261	150	CAR-H 020
DN350	660	330	256	ØD/2	36	261	150	CAR-H 024
DN400	720	360	278	ØD/2	38	315	180	CAR-H 035

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data

TABLE 2 - DIMENSION G3FMT-SLM Middle (Standard leakage)								
Type	L	L1	H	H1	B	C	M	ELECTRIC ACTUATOR TYPE CAR-H
DN100 (*HF)	296	148	140	ØD/2	24	223	110	CAR-H 006
DN125	330	165	140	ØD/2	24	223	110	CAR-H 006
DN125 (JIS5K)	320	160	140	ØD/2	19	223	110	CAR-H 006
DN150	356	178	149	ØD/2	25,4	223	110	CAR-H 006
DN200	410	205	182	ØD/2	28,4	223	110	CAR-H 010
DN200 (**L)	484	242	182	ØD/2	28,4	223	110	CAR-H 010
DN250	480	240	202	ØD/2	31	223	110	CAR-H 010

All dimension in mm

* High flow

**Long version

***Reduced flow

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

3. Technical data

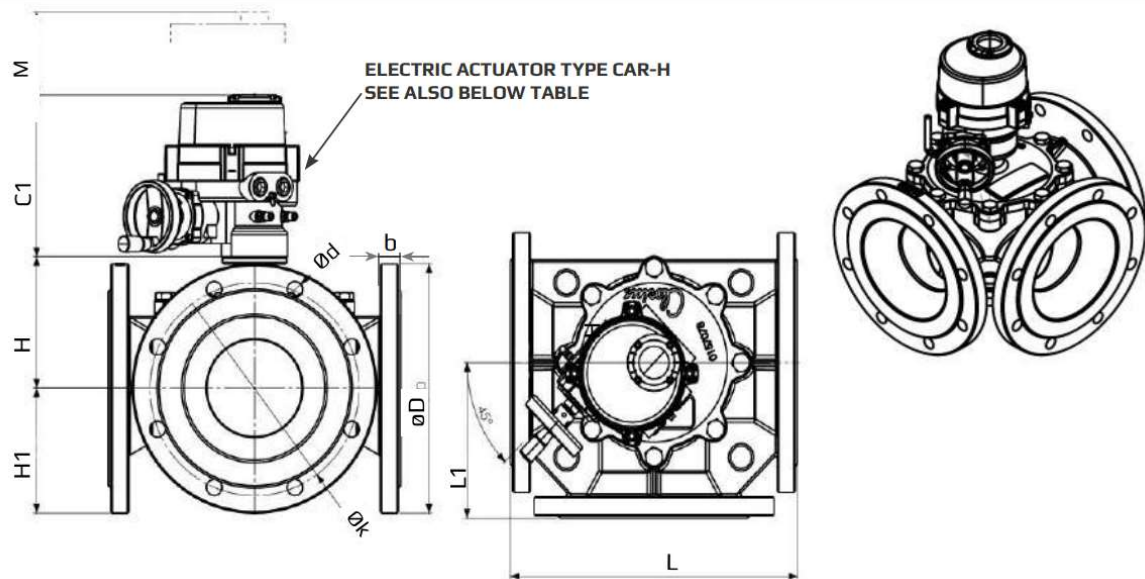


TABLE 3 DIMENSION - FLANGES

Flange	EN 1092 -2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
	D (dia.) mm	k (dia.) mm	d (dia.) No.	D (dia.) mm	k (dia.) mm	d (dia.) No.	D (dia.) mm	k (dia.) mm	d (dia.) No.	D (dia.) mm	k (dia.) mm	d (dia.) No.
DN100	220	180	19x(8)	230	191	19x(8)	200	165	19x(8)	210	175	19x(8)
DN125	250	210	19x(8)	255	216	22x(8)	235	200	19x(8)	250	210	23x(8)
DN150	285	240	23x(8)	280	241	22x(8)	265	230	19x(8)	280	240	23x(8)
DN200	243	295	22x(8)	343	298	22x(8)	320	280	23x(8)	330	290	23x(12)
DN250	405	350	23x(12)	405	362	25x(12)	385	345	23x(12)	400	355	25x(12)
DN300	455	400	23x(12)	483	432	25x(12)	430	390	23x(12)	445	400	25x(16)
DN350	505	460	23x(16)	533	476	29x(12)	480	435	25x(12)	490	445	25x(16)
DN400	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)

*G3FMT-MULL & SL (Middle) only available from DN100 up to D250

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

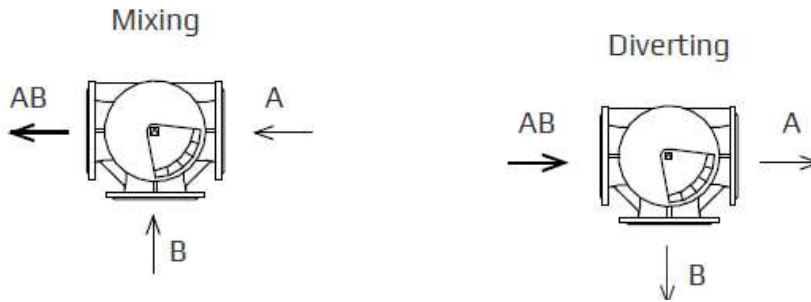
4. Installation and commission

Installation and port numbering for G3FMT-ULL and SL Left and right

PORT NUMBERING: AB RIGHT



PORT NUMBERING: AB LEFT



MOUNTING

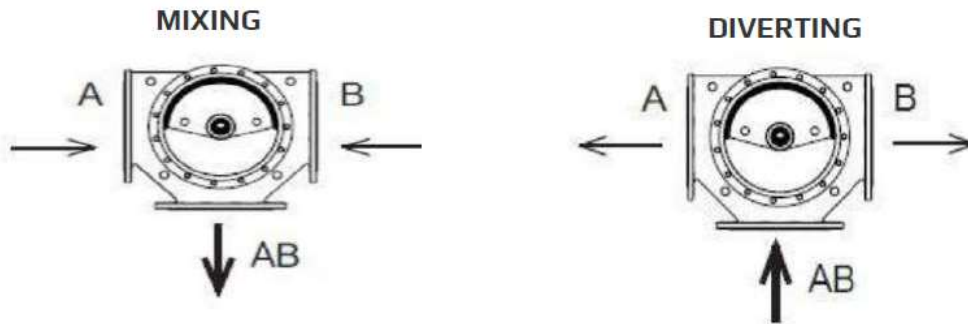
The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

4. Installation and commissioning

Installation and port numbering for G3FMT-MULL and SLM Middle

PORT NUMBERING: AB MIDDLE



MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft. The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

4. Installation and commissioning

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

5. Operation

The valves are designed for use in conjunction with valve motor type CAR-H with handle for manual operation or for use in conjunction with a pneumatic actuator type VT.

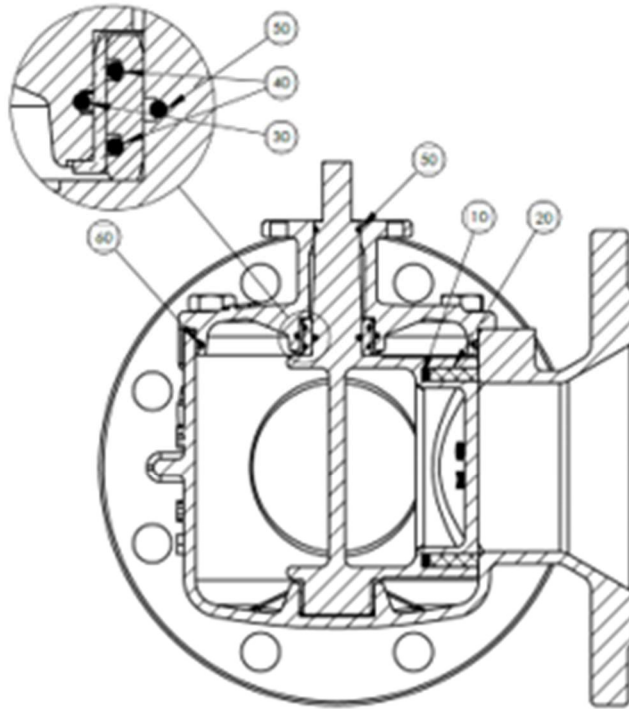
6. Maintenance schedule

The sealings have a durability of approximately 10 years at continuous use. However, it is recommended that the gaskets are inspected and changed if needed every 5 years if possible.

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

7. Spare Parts

3 WAY CONTROL VALVE G3FMT-ULL – PACKING SET Nodular cast iron, PN10, DN100 - 300 mm (R/L/M CLASS – IV)



CLASS IV – AB-R/L

POS.	DESCRIPTION	PCS
10	O-RING FOR SLIDE	1
20	PTFE SEALING SEAT	1
30	O-RING Ø46X2.5	1
40	O-RING Ø36x2.5	2
50	O-RING Ø23x2.5	2
60	O-RING FOR COVER	1

CLASS IV – AB-M

POS.	DESCRIPTION	PCS
10	O-RING FOR SLIDE	2
20	PTFE SEALING SEAT	2
30	O-RING Ø46X2.5	1
40	O-RING Ø36x2.5	2
50	O-RING Ø23x2.5	2
60	O-RING FOR COVER	1

PACKING SET FOR G3FMT – ULL AB-R/L CLASS IV		
POS.	DESCRIPTION	ORDER NO.
10 - 60	DN100 – G3FMT-ULL	1-2991583
10 - 60	DN125 – G3FMT-ULL	1-2991583
10-60	DN150 – G3FMT-ULL	1-2991581
10 - 60	DN200 – G3FMT-ULL	1-2991577
10 - 60	DN250 – G3FMT-ULL	1-2991579
10 - 60	DN300 – G3FMT-ULL	N/A

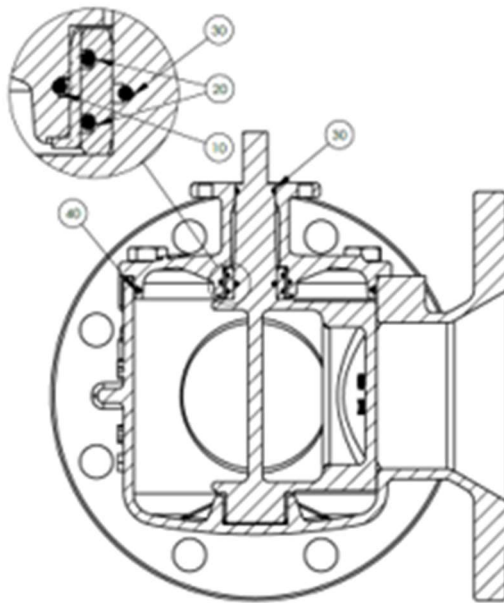
PACKING SET FOR G3FMT – ULL AB-M CLASS IV		
POS.	DESCRIPTION	ORDER NO.
10 - 60	DN100 – G3FMT-ULL	1-2991585
10 - 60	DN125 – G3FMT-ULL	1-2991585
10 - 60	DN150 – G3FMT-ULL	1-2991586
10 - 60	DN200 – G3FMT-ULL	1-2991587
10 - 60	DN250 – G3FMT-ULL	1-2991588
10 - 60	DN300 – G3FMT-ULL	N/A

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

7. Spare Parts

SPARE PART FOR 3 WAY CONTROL VALVE G3FMT-SL (STANDARD FLOW) - PACKING SET

Nodular cast iron, PN10, DN100 - 250 mm (R/L/M CLASS – I)



POS.	DESCRIPTION	PCS
10	O-RING Ø46x2.5	1
20	O-RING Ø36x2.5	2
30	O-RING Ø23x2.5	2
40	O-RING FOR COVER	1

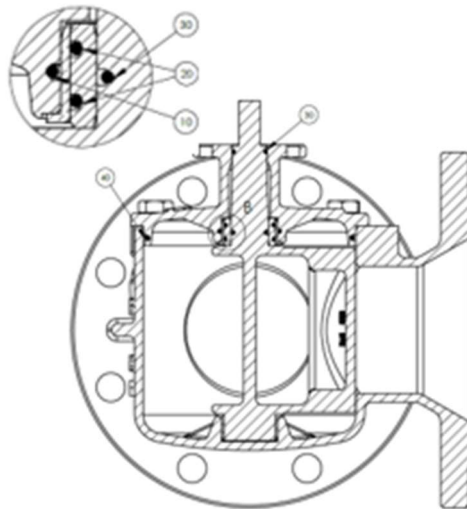
PACKING SET FOR G3FMT – SL (R/L/M) CLASS I		
POS.	DESCRIPTION	ORDER NO.
10 - 40	DN100 – G3FMT-SL	1-2991584
10 - 40	DN125 – G3FMT-SL	1-2991584
10 - 40	DN150 – G3FMT-SL	1-2991582
10 - 40	DN200 – G3FMT-SL	1-2991578
10 - 40	DN250 – G3FMT-SL	1-2991580

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

7. Spare Parts

3 WAY CONTROL VALVE G3FMT-SL (STANDARD FLOW) – PACKING SET

Nodular cast iron, PN10, DN300 - 400 mm (R/L CLASS – I)



POS.	DESCRIPTION	PCS
10	O-RING Ø60x3	1
20	O-RING Ø48x3	2
30	O-RING Ø38x3	2
40	O-RING FOR COVER	1

PACKING SET FOR G3FMT – SL (R/L) CLASS I		
POS.	DESCRIPTION	ORDER NO.
10 - 40	DN300 – G3FMT-SL	1-2991589
10 - 40	DN350 – G3FMT-SL	1-2991590
10 - 40	DN400 – G3FMT-SL	1-2991591

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

8. Transport and storage

The valve must be transported and stored dry and clean. In humid rooms, a drying material or heating must be used to avoid condensation.

During transport and intermediate storage the valve should not be exposed to temperatures lower than -10°C.

The valves are painted (top coated) on the outside. This coating must remain without damage, otherwise the faulty spots must be repaired immediately.

The standard packaging protects valves and equipment against rain and snow during trucking.

For critical transports, such as sea freight, equipment will be protected by VCI (Volatile Corrosion Inhibitor) material.

If protected by VCI do not remove the packaging until the equipment is going to be installed.

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

9. Related Documentation

Data sheets	Description
0-2.6.15	3-way control valve type G3FMT-ULL Ultra Low Leakage (Left & Right)
0-2.6.16	3-way control valve type G3FMT-SL Standard Leakage (Left & Right)
0-2.6.17	3-way control valve type G3FMT-MULL Ultra Low Leakage (Middle)
0-2.6.18	3-way control valve type G3FMT-SLM Standard Leakage (Middle)
S-2.6.15	Packing set: 3-way control valve type G3FMT-ULL (Left, Right & Middle) – DN100,300
0-2.6.16-1	Packing set: 3-way control valve type G3FMT-SL (Left & Right) – DN300,400
0-2.6.16-2	Packing set: 3-way control valve type G3FMT-SL (Left, Right & Middle) – DN100,250
0-4.11.09	Electric valve actuator type CAR-H
0-6.5.16	Pneumatic actuator type VT double acting

3-WAY CONTROL VALVE G3FMT – ULTRA LOW LEAKAGE (ULL/MULL) AND STANDARD LEAKAGE (SL/SLM)

Or write to Clorius Controls: mail@cloriuscontrols.com

See also www.cloriuscontrols.com for further information

End of instruction