

# External Gear Pumps HFR SERIES



hydrat

# FEATURES

- Made in Italy
- Bodies and covers in cast iron that ensures durability and robustness
- High pressure operations (up to 300 bar) with continuous maximum pressure capability
- Unidirectional and bidirectional pumps
- High-temperature seals available
- Multiple pumps availability
- High volumetric efficiency, averaging greater than 95%. This high efficiency ensures optimal performance and energy savings
- Axial compensation achieved using pressure balanced bushing blocks
- Low noise thanks to gear tooth profile accurately projected



# USE CONDITIONS

Hydraulic fluids	Mineral oil (DIN 51524). For use with fire resistant fluids like water glycol, water-oil emulsion and phosphate-esters, contact our technical office.			
Inlet pressure	0.7 - 3 bar (10 - 44 psi)			
Oil speed on suction line	0.5 ÷ 1.5 m/s			
Oil speed on pressure line	6 ÷ 10 m/s			
Oil temperature	-10°C ÷ 80°C			
Oil viscosity	20 ÷ 120 mm <sup>2</sup> /s (Cst)			
Max starting viscosity	700 mm <sup>2</sup> /s (Cst)			
Oil filtration	Pressure (bar)	< 140	140 > 210	>210
	Contamination class NAS 1638	10	9	8
	Contamination class ISO 4406:1999	21/19/16	20/18/15	19/17/14
	Ratio β <sub>10</sub> ≥ 75 - ISO16889	//	10 μm	10 μm
	Ratio β <sub>25</sub> ≥ 200 - ISO16889	25 μm	//	//

# TECHNICAL DATA

## HFR SIZE 3

Type		25	35	45	55	64	80
Capacity	Cm <sup>3</sup> / rev	24.9	34.3	45.2	54.5	63.9	78.7
Delivery at 1500 rev. / min	l / min	37.4	51.5	67.8	81.8	95.9	118
P1 Max working pressure	Bar	300	290	280	250	230	190
P2 intermittent pressure	Bar	320	300	290	270	250	220
P3 Max peak pressure	Bar	350	330	310	290	260	230
Max speed for P1 pressure	Rpm	3000	2500	2500	2000	2000	1800
Max speed without load	Rpm	3500	3000	2800	2500	2500	2200
Min speed for P1 pressure	Rpm	450	350	350	300	250	200

## HFR SIZE 4

Type		75	90	110	130	150
Capacity	Cm <sup>3</sup> / rev	72.1	88.7	105.4	127.5	149.7
P1 Max working pressure	Bar	270	250	240	220	180
P2 intermittent pressure	Bar	300	280	250	240	200
P3 Max peak pressure	Bar	320	300	280	260	220
Max speed for P1 pressure	Rpm	1800	1800	1500	1500	1500
Max speed without load	Rpm	2500	230	2000	2000	2000
Min speed for P1 pressure	Rpm	300	300	250	250	250

Verify the compatibility among performance of pressure, flow required and torque of the shaft through the below formulas.

*With bidirectional pumps or motors, pressure is reduced by 15%.*

# HFR DETERMINATION OF NOMINAL SIZE

**For pumps**

$$Q = \frac{V * \eta_v * n}{1000}$$

$$M = \frac{p * V}{62.8 * \eta_m}$$

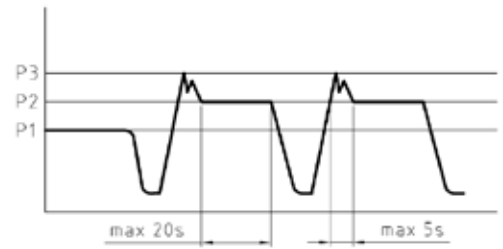
$$P = \frac{p * Q}{600 * \eta_t}$$

**For motors**

$$Q = \frac{V * n}{1000 * \eta_v}$$

$$M = \frac{p * V * \eta_m}{62.8}$$

$$P = \frac{p * Q * \eta_t}{600}$$



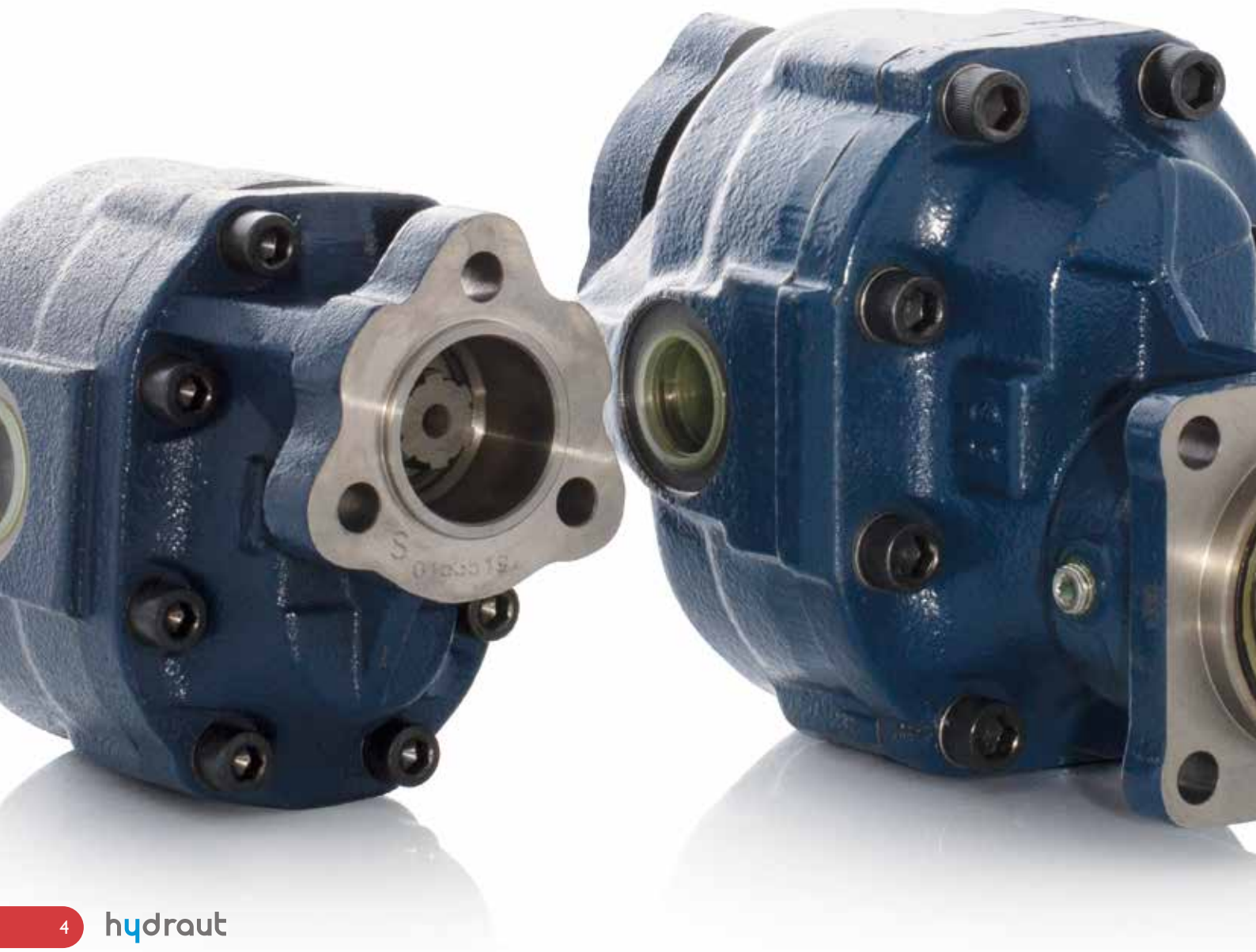
V [cm<sup>3</sup>]

Q [l/min]

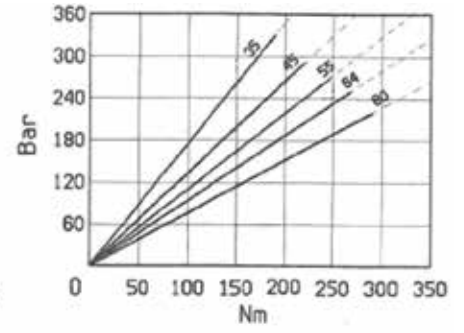
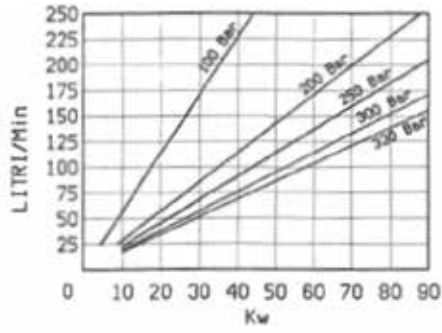
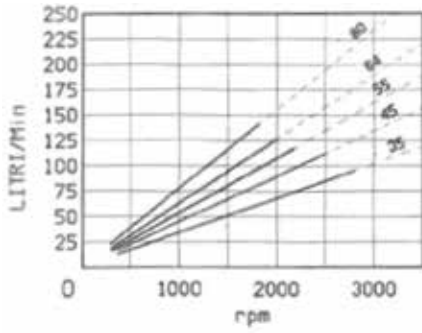
p [bar]

M [Nm]

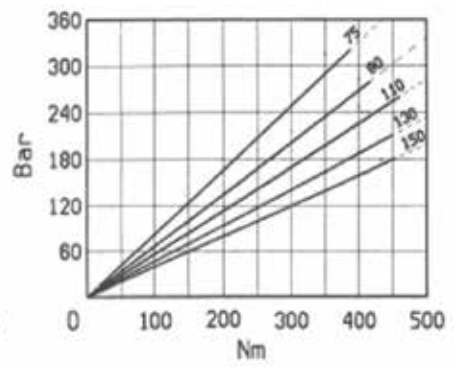
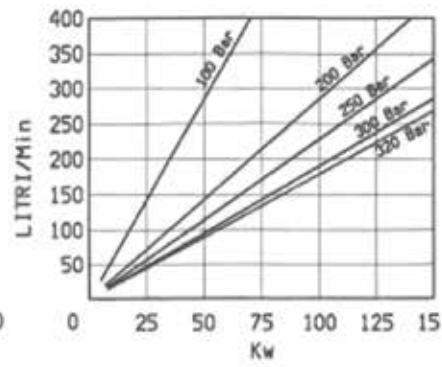
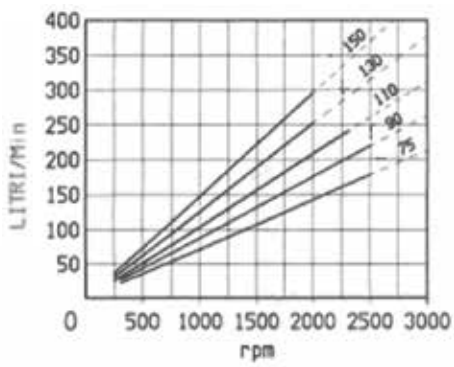
$\eta_v = \text{EFF vol.} \geq 95$



## HFR3 DIAGRAMS



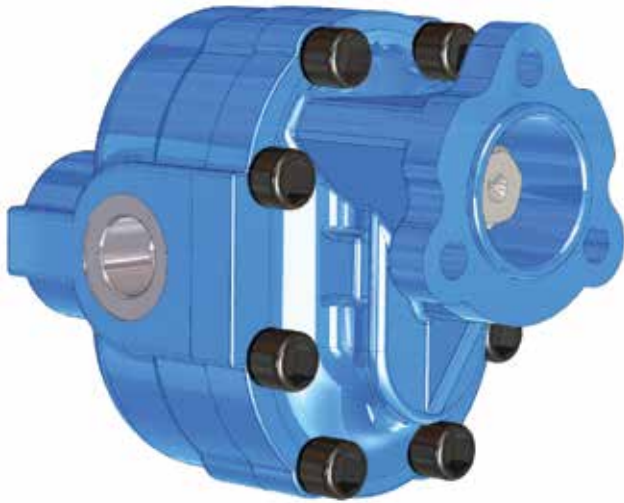
## HFR4 DIAGRAMS



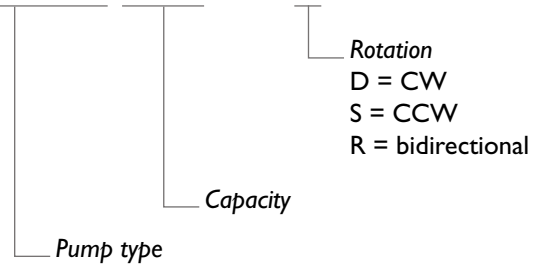


# HFR 3 UNI

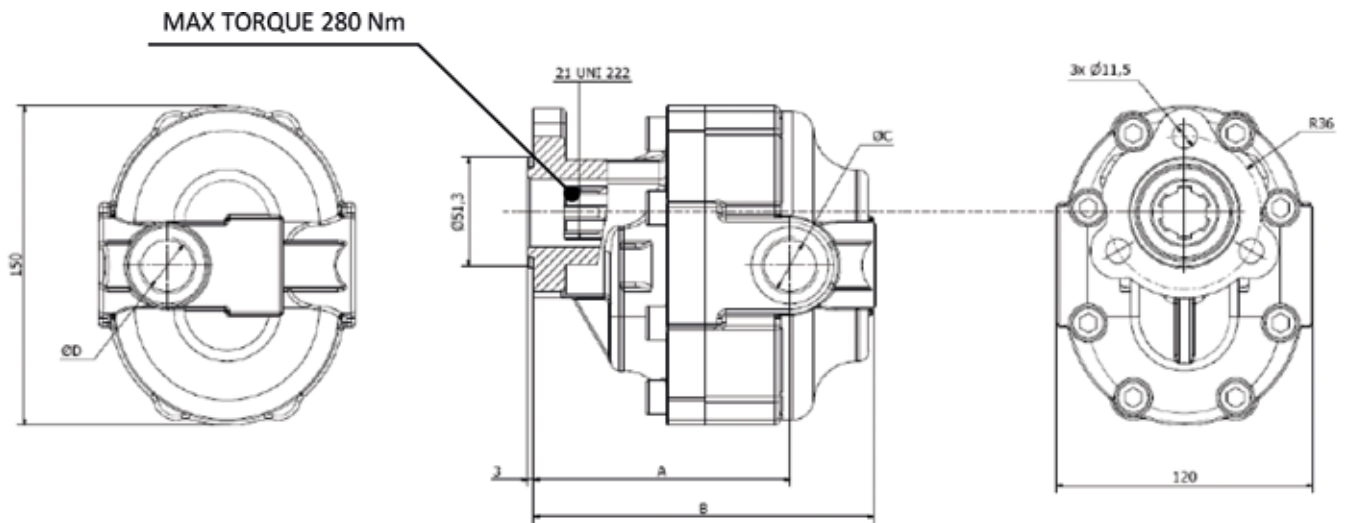
GEAR PUMPS



**032HFR 025 00 S**



## DIMENSIONS/CODES



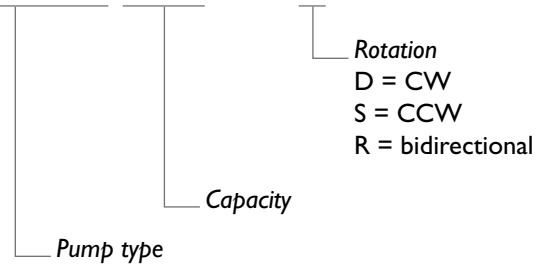
TYPE	cm <sup>3</sup> /rev	A	B	C			Kg
				IN	OUT	BIDIR.	
032HFR-025	24.9	145	175	3/4"	1/2"	3/4"	11.6
032HFR-035	34.3	141	187	3/4"	1/2"	3/4"	12.6
032HFR-045	45.2	131	194	1"	3/4"	1"	13.1
032HFR-055	54.2	137	200	1"	3/4"	1"	13.7
032HFR-064	63.9	143	206	1"	3/4"	1"	14.5
032HFR-080	78.7	143	216	1"-1/4	1"	1"-1/4	14.8

# HFR 3 ISO

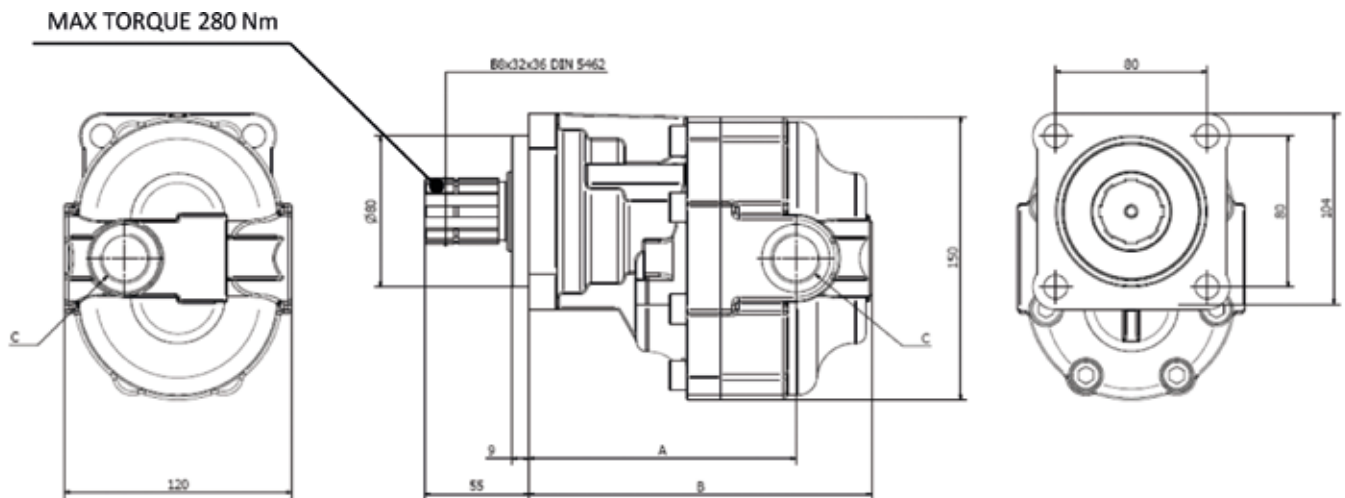
GEAR PUMPS



**032HFR 025 E0 D**



DIMENSIONS/CODES



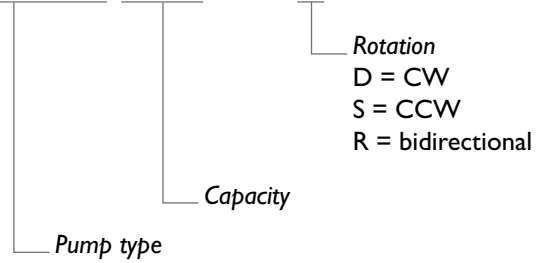
TYPE	cm <sup>3</sup> /rev	A	B	C			Kg
				IN	OUT	BIDIR.	
032HFR-025	24.9	145	175	3/4"	1/2"	3/4"	13.8
032HFR-035	34.3	141	187	3/4"	1/2"	3/4"	14.8
032HFR-045	45.2	131	194	1"	3/4"	1"	15.3
032HFR-055	54.2	137	200	1"	3/4"	1"	15.9
032HFR-064	63.9	143	206	1"	3/4"	1"	16.7
032HFR-080	78.7	143	216	1"-1/4	1"	1"-1/4	17.1

# HFR 3 TD UNI

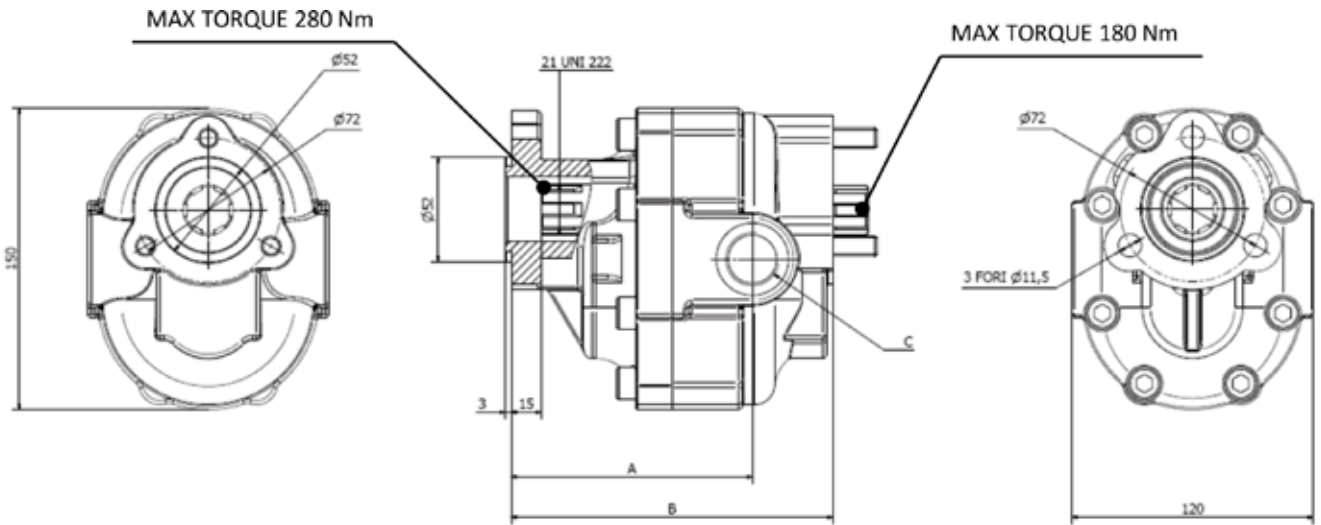
TANDEM GEAR PUMPS



**032HFR 035 OT S**



## DIMENSIONS/CODES



TYPE	cm <sup>3</sup> /rev	A	B	C			Kg
				IN	OUT	BIDIR.	
032HFR-035	34.3	141	187	3/4"	1/2"	3/4"	12.6
032HFR-045	45.2	131	194	1"	3/4"	1"	13.1
032HFR-055	54.2	137	200	1"	3/4"	1"	13.7
032HFR-064	63.9	143	206	1"	3/4"	1"	14.5
032HFR-080	78.7	143	216	1"-1/4	1"	1"-1/4	14.8

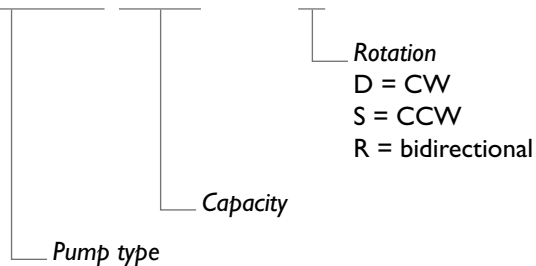


# HFR 3 TD ISO

TANDEM GEAR PUMPS

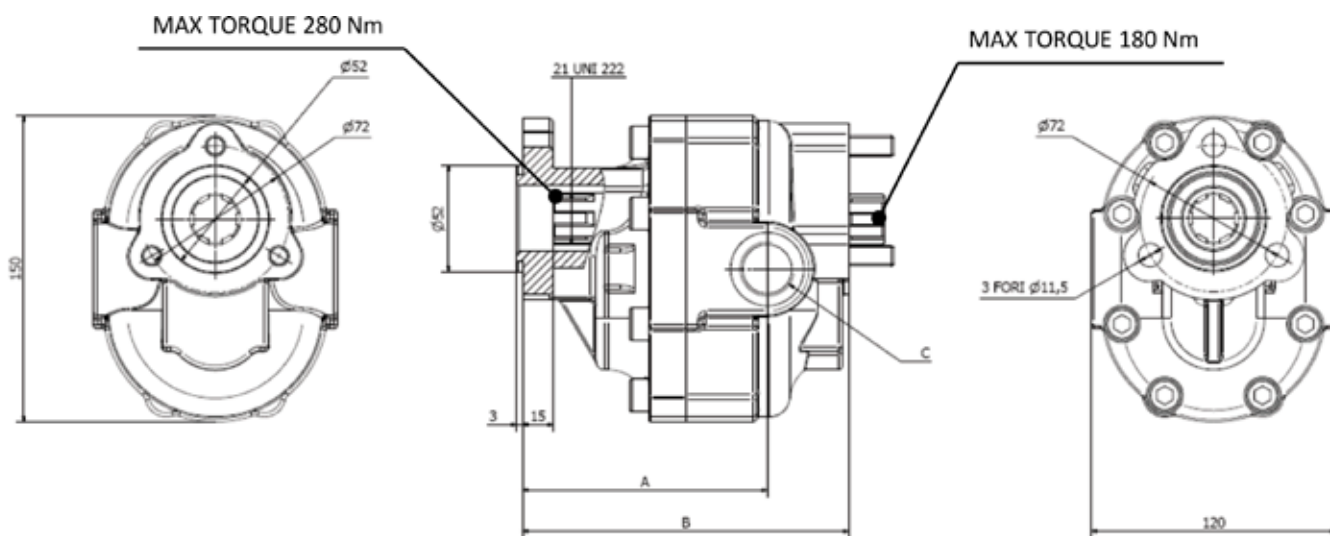


**032HFR 035 ET D**



HFR

DIMENSIONS/CODES



TYPE	cm <sup>3</sup> /rev	A	B	C			Kg
				IN	OUT	BIDIR.	
032HFR-035	34.3	141	187	3/4"	1/2"	3/4"	15.0
032HFR-045	45.2	131	194	1"	3/4"	1"	15.5
032HFR-055	54.2	137	200	1"	3/4"	1"	16.1
032HFR-064	63.9	143	206	1"	3/4"	1"	16.9
032HFR-080	78.7	143	216	1"-1/4	1"	1"-1/4	17.3

# HFR 4 UNI

GEAR PUMPS



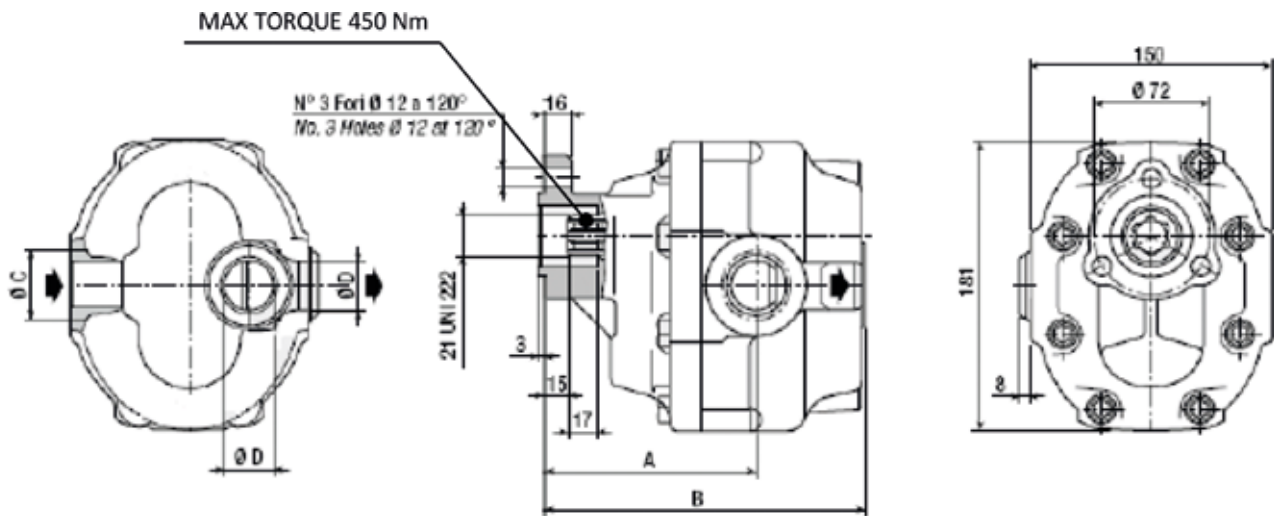
**042HFR 110 00 D**

Rotation  
 D = CW  
 S = CCW  
 R = bidirectional

Capacity

Pump type

## DIMENSIONS/CODES



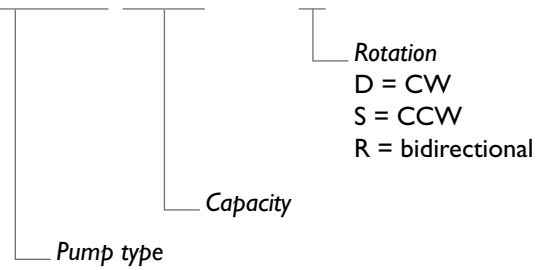
TYPE	cm <sup>3</sup> /rev	A	B	C	D	Kg
				IN	OUT	
042HFR-075	72.1	152	216	1"-1/4 G	1" G	19.5
042HFR-090	88.7	158	222	1"-1/4 G	1" G	20.3
042HFR-110	105.4	164	228	1"-1/4 G	1" G	21.5
042HFR-130	127.5	160	236	1"-1/4 G	1" G	22.6
042HFR-150	149.7	168	244	1"-1/4 G	1" G	23.1

# HFR 4 ISO

GEAR PUMPS



**042HFR 110 E0 D**



HFR

## DIMENSIONS/CODES



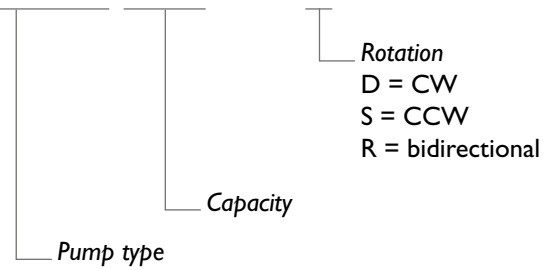
TYPE	cm <sup>3</sup> /rev	A	B	C	D	Kg
				IN	OUT	
042HFR-075	72.1	152	216	1"-1/4 G	1" G	19.5
042HFR-090	88.7	158	222	1"-1/4 G	1" G	20.3
042HFR-110	105.4	164	228	1"-1/4 G	1" G	21.5
042HFR-130	127.5	160	236	1"-1/4 G	1" G	22.6
042HFR-150	149.7	168	244	1"-1/4 G	1" G	23.1

# HFR 4 TD UNI

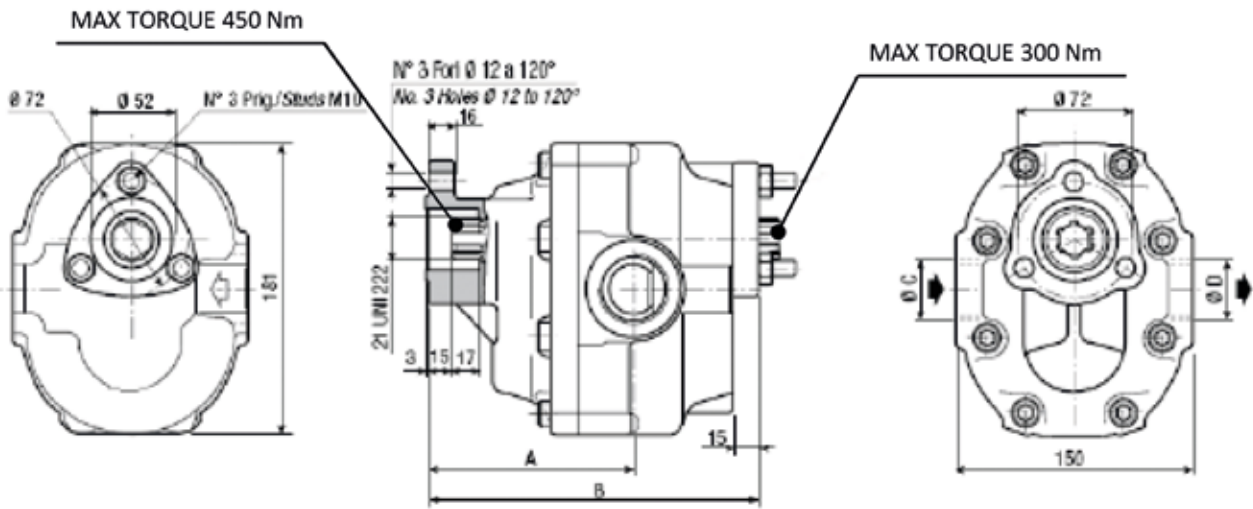
TANDEM GEAR PUMPS



042HFR 110 0T D



## DIMENSIONS/CODES



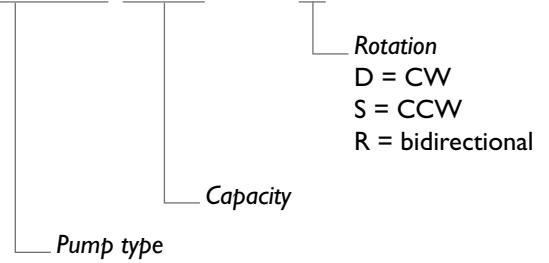
TYPE	cm <sup>3</sup> /rev	A	B	C	D	Kg
				IN	OUT	
042HFR-075	72.1	152	216	1"-1/4 G	1" G	19.5
042HFR-090	88.7	158	222	1"-1/4 G	1" G	20.3
042HFR-110	105.4	164	228	1"-1/4 G	1" G	21.5
042HFR-130	127.5	160	236	1"-1/4 G	1" G	22.6
042HFR-150	149.7	168	244	1"-1/4 G	1" G	23.1

# HFR 4 TD ISO

TANDEM GEAR PUMPS

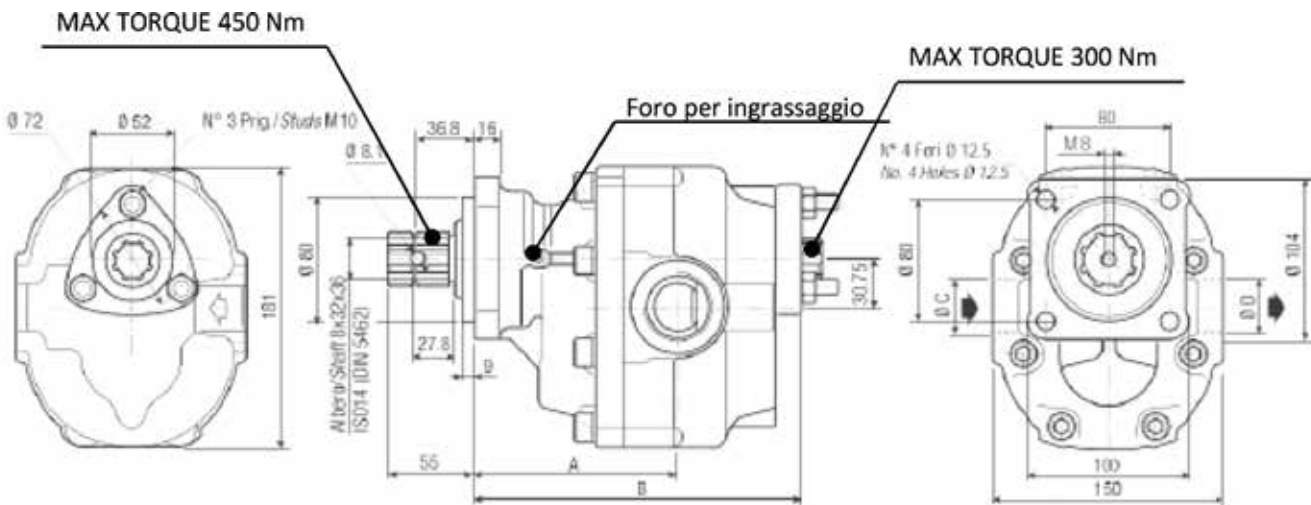


**042HFR 110 E0 D**



HFR

DIMENSIONS/CODES

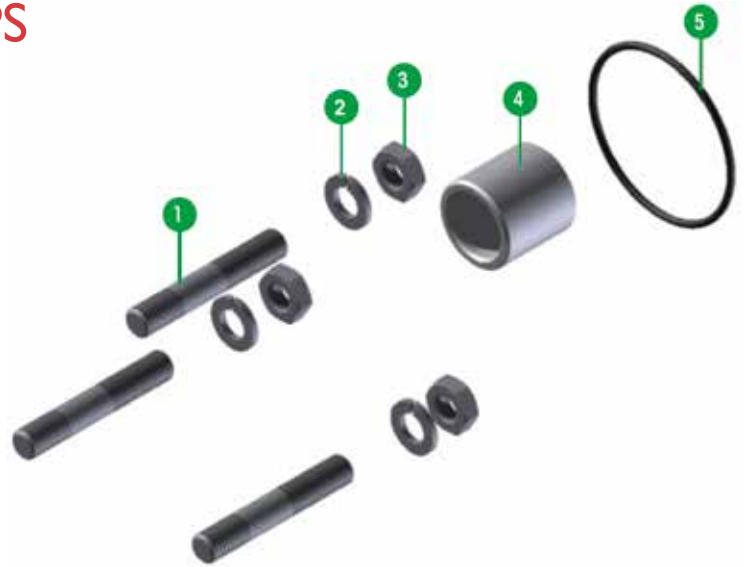


TYPE	cm <sup>3</sup> /rev	A	B	C	D	Kg
				IN	OUT	
042HFR-075	72.1	152	216	1"-1/4 G	1" G	19.5
042HFR-090	88.7	158	222	1"-1/4 G	1" G	20.3
042HFR-110	105.4	164	228	1"-1/4 G	1" G	21.5
042HFR-130	127.5	160	236	1"-1/4 G	1" G	22.6
042HFR-150	149.7	168	244	1"-1/4 G	1" G	23.1



## KIT FOR TANDEM PUMPS

HFR SIZE 3 AND 4



Rif.	Description	Qt.
1	Stud	3
2	Washer	3
3	Nut	1
4	Coupling	1
5	Gasket	1

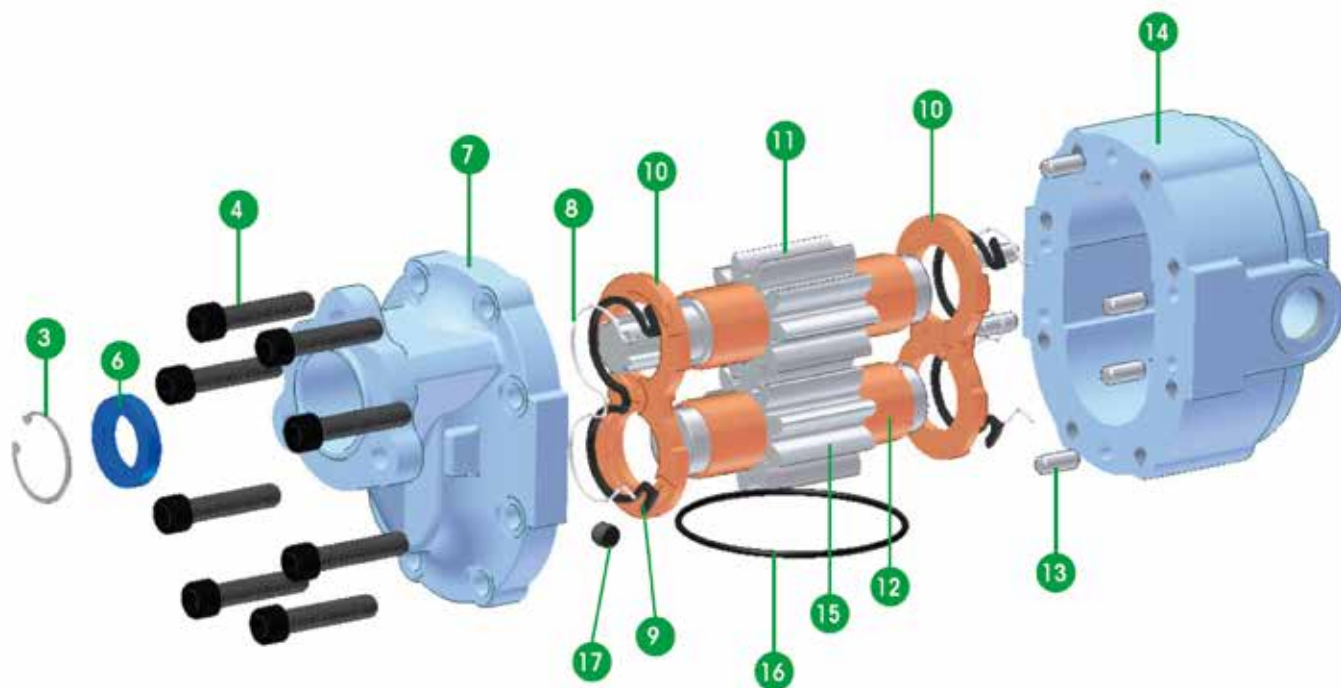
## INTEGRATED BEARINGS FOR ISO PUMP

HFR SIZE 3 AND 4



Rif.	Description	Qt.
1	Shaft	1
2	Shaft seal	1
3	Snap ring	1
4	Roller bearing	1
5	Washer	1
6	Roller bearing	1
7	Snap ring	1

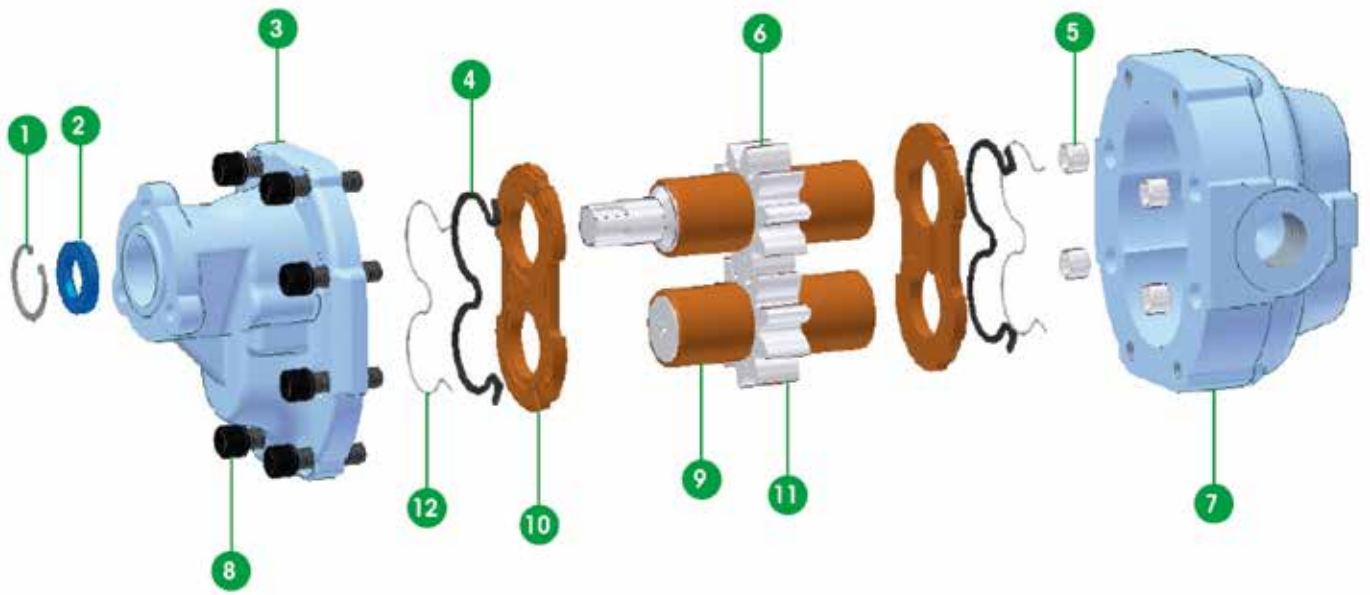
## COMPONENTS SIZE 3



HFR

Rif.	Description	Qt.
3	Snap ring	1
4	Bolt	8
6	Rotary shaft seal	1
7	Front flange	1
8	B-K seals	2
9	Compensation seal	2
10	Thrust plates	2
11	Drive gear	1
12	Bushing	4
13	Pin	6
14	Housing	1
15	Idle gear	1
16	Under cover seal	1
17	Grub screw 1/8" G	1

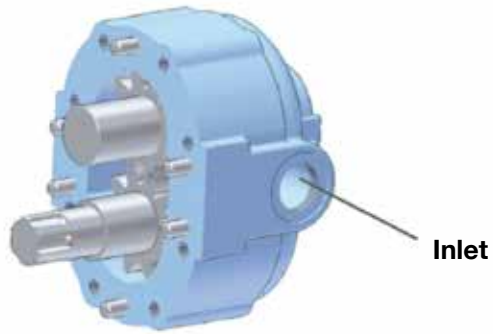
# COMPONENTS SIZE 4



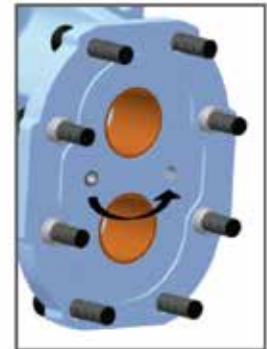
Rif.	Description	Qt.
1	Snap ring	1
2	Rotary shaft seal	1
3	Flange	1
4	Compensation seal	2
5	Pin	1
6	Drive gear	1
7	Housing	1
8	Bolt	8
9	Bushing	4
10	Bushing block	2
11	Idle gear	1
12	Seal against extruding	2

# HFR 3 AND 4 CHANGING ROTATION OF THE PUMP

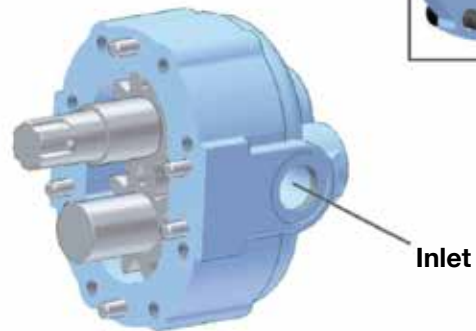
**CW rotation**



**An arrow on the housing of the pump indicates the rotation**



**CCW rotation**



- Unscrew the clamping bolts
- Remove the flange holding down the drive gear
- Remove the drive gear and the bushing block holding down the idle gear
- Remove the idle gear keeping down the rear bushing block with a no-metallic bar
- Reverse the position of the two gears (see picture above)

- Replace the bushing block without rotate or changing position.
- Changing position of the grub screw on the flange (see picture above).
- Reverse the flange and retighten the bolts to a torque rating between 44-48 ft/lbs (for size 3) or 89 ft/lbs (for size 4)







