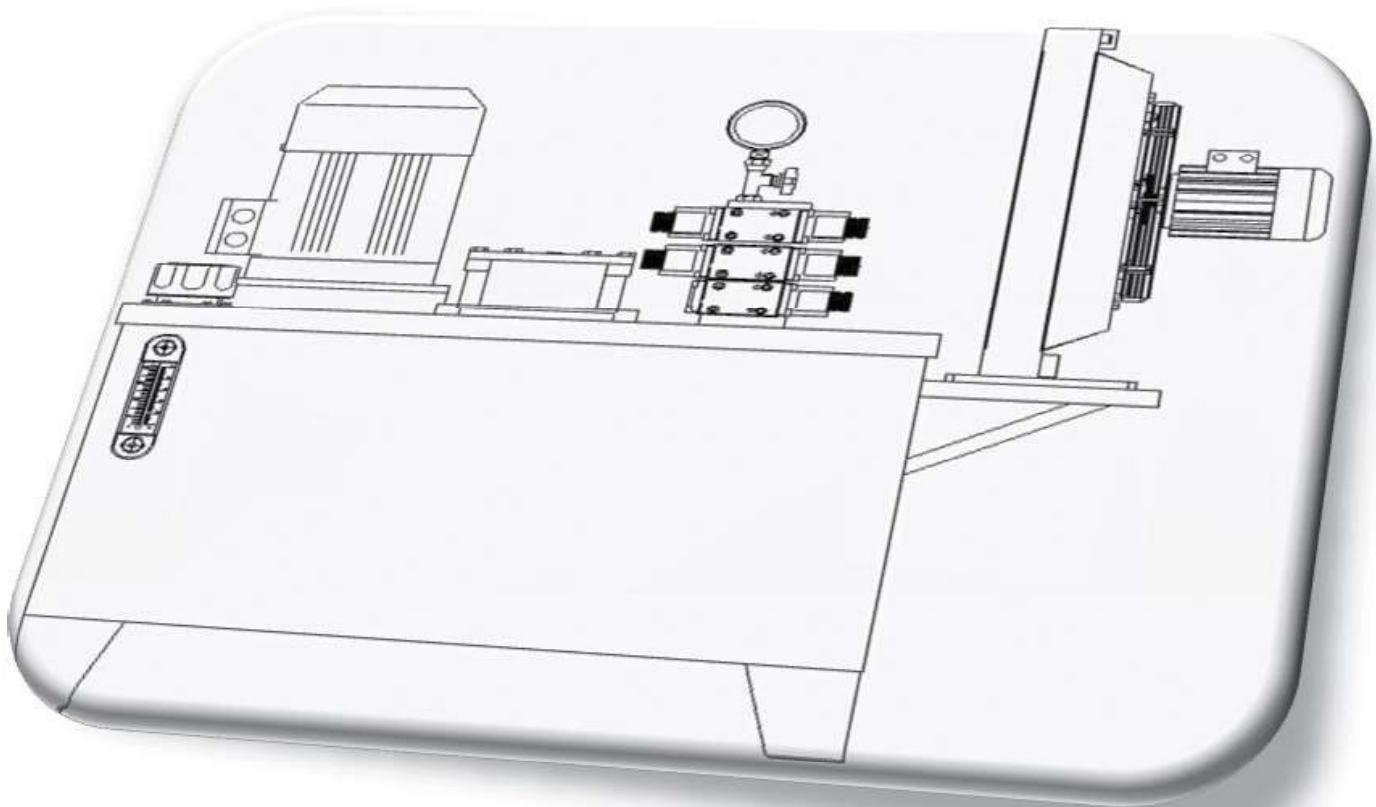




**GENERAL FLUIDI**  
SISTEMI DI OLEODINAMICA INDUSTRIALE

# **HYDRAULIC POWER PACK OPERATING INSTRUCTIONS**



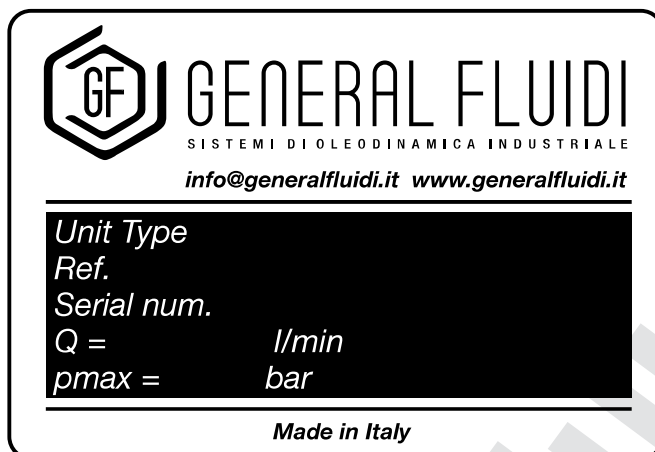
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## Other enclosures

Declaration of conformity	<b>YES</b>	NO
Hydraulic scheme	<b>YES</b>	NO
Parts list	<b>YES</b>	NO

## HYDRAULIC CONTROL UNIT



The control unit has been regularly tested and then emptied: therefore, in order for it to operate correctly, follow the instructions below:

- Fill the tank to its limit with oil corresponding to the specifications indicated on the attached sheet.
- Check that the electric motor rotates in the direction of the arrow.
- Start up for the first time, with the consumer operating at minimum pressure, until all the air has been removed from the circuit..
- Check the oil level again as, if the circuit is complex and has cylinders, after these have been filled the oil level requires topping up.
- Run the unit at low speed for a few hours and check the filter cartridge, cleaning it thoroughly by washing it with opportune detergent without solvents and blowing it with a jet of compressed air from the inside towards the outside. If it is below 60 micron it should be replaced.
- Perform this procedure at least 4 or 5 times during the first hours of operation. The pressure adjustment valve is normally set when tested to the maximum pressure permitted. Therefore, for lower requirements, loosen the handwheel until reaching the required value. Take care never to go above the maximum pressure indicated on the ratings plate of the control unit.
- During the first day of operation at full load, check the oil temperature, reading the vales every hour in order to establish the normal working temperature. This must not exceed 50°C. If it does, by analysing the readings taken we can establish the specifications of the appropriate heat exchanger to be used.
- After the readings for setting at work, in order to prevent premature wear to the gauge, it is advisable to exclude it by closing the cock.

***When requesting detached parts or overhauls, always quote the reference number of the control unit involved.***

**GENERAL FLUIDI s.r.l.**

## USING THE USER INSTRUCTIONS MANUAL

GENERAL FLUIDI s.r.l. invites the user to follow the instructions reported in this Manual very carefully.

Before carrying out any type of operation on the hydraulic power pack applied to equipment or machines, carefully read the following Manual.

This Manual has been prepared for skilled and competent personnel. It provides instructions for using the product correctly. **This Manual cannot replace the professional skills and expertise of the installer.**

This Manual may be subject to changes and additions given the continuous product updates and developments, but cannot be considered to be obsolete.

GENERAL FLUIDI s.r.l. will not be held responsible in case of:

- improper use of the hydraulic power pack, meaning any use not expressly reported in this Manual;
- assembly and installation by unskilled and/or incompetent personnel;
- incorrect assembly and installation;
- defects and problems caused by the electric power supply;
- deficiencies or inadequacies in foreseen maintenance;
- unauthorised operations and changes;
- non-compliance with instructions;
- use of non-original and/or non-specific spare parts for the type of hydraulic power pack used;
- use with performances, load values, work conditions and insertion times that exceed or are not foreseen in the GENERAL FLUIDI s.r.l. technical documentation.



Competent person: a person who, as result of Technical Training and experience, has sufficient knowledge in the sector.

The improper use and incorrect choice of the product (as well as accessories) may cause serious injuries to persons and damage to property. This Manual and the GENERAL FLUIDI s.r.l. technical documentation provide additional data to users who are competent in the sector (or for whom competent personnel are available).

## GENERAL SAFETY INSTRUCTIONS

- > Do not tamper with any type of valve, fitting, accessory or part of the applied hydraulic power pack; even simply loosening a valve might cause loads or structures to yield.
- > All the operations to install, assemble, perform maintenance and disassemble the hydraulic power pack and the parts applied to it, must be carried out with the utmost compliance with safety standards: no pressure should ever be present inside the hydraulic oil circuit (zero pressure) and there should be no load on the equipment structure or the machine to which the hydraulic power pack is applied (zero load).

### **PAY ATTENTION TO ELECTRICAL PARTS AND THE PROVISIONS DESCRIBED BELOW**

- > Before carrying out any type of operation or work on the hydraulic power pack, disconnect the motors and any other type of electrical device from the electric power supply; all the electrical connection and disconnection operations must be carried out by skilled and competent personnel.
- > For the non-electric motors or devices (pneumatic, hydraulic, mechanical, etc...) they must first be disconnected from the supply network and placed in the condition in which they will not produce energy, not even accidentally, and thus movement.
- > Use safety guards;
- > Work under absolutely clean conditions;
- > Work under the highest safety conditions;
- > Use suitable and clean instruments, tools and service benches;
- > During operations involving:
  - start-up
  - normal work,
  - maintenance,
  - system adjustment and blow-off,
  - operation and drive on valves and various control components,

sudden sprays and leaks of hydraulic fluid may occur and may reach temperatures that will burn the skin.

## PROGRAMMED OPERATIONS

In over thirty years of experience in the sector of hydraulic systems we have reached the conclusion that the reliability and life span of systems are strongly influenced by maintenance.

Therefore, in the spirit of collaboration which has always been our policy, we thought you would find it useful to have a list of programmed operations which, although general, give a good indication on how to carry out correct maintenance.

### Programmed maintenance

Operations to Perform	Frequency	Date of Operation
Clean outside	every 4 months	
Top up fluid	when this reaches the minimum level	
Replace fluid and clean inside	every 3000 hours of operation	
Clean the intake filter	every 2 months	
Replace air filter cartridge	every 3 months	
Replace fluid filter cartridge	every 3 months	
Check accumulator preload	every 6 months	
Check clamp on unions	every 3 months	
Clean heat exchanger and replace zinc	every year	
Replace rubber elements of drive coupling	every 6 months	
Drive coupling	every week	

### Spare parts recommended for normal maintenance

MATERIAL	TYPE
CARTRIDGE	
JOINT BLOCK	
MANOMETER	
COILS	

### FLUIDS RECOMMENDED

**GENERAL FLUIDI** adopted the use of hydraulic fluids based entirely on natural ingredients not containing mineral oil, sulfur, chlorine and nitrogen and that do not decompose into toxic or dangerous products. Their Biodegradability is factor of more than 90%.

#### APPROVALS SPECIFICATIONS:

SO/CD "ECO" HETG  
VDMA 24568 HETG

GENERAL FLUIDI ADVISE ITS CUSTOMERS TO USE NATURAL BASED BIODEGRADABLE HYDRAULIC FUEL

## MINERAL FLUID TABLE

STICKNESS HV, HLP, HM	VG 22	VG 32	VG 46	VG 68	VG 100
<b>Producer</b>					
<b>AGIP</b>	OSO 22 ARNICA 22	OSO 32	OSO 46	OSO 68	OSO 100
<b>ARAL</b>	Aral Vitam GF 22	Aral Vitam GF 32	Aral Vitam GF 46	Aral Vitam GF 68	Aral Vitam GF 100
<b>AVIA</b>	AVIALUB RSL 22	AVIALUB RSL 32	AVIALUB RSL 46	AVIALUB RSL 68	AVIALUB RSL 100
<b>CASTROL</b>	HYSPIN AWS 22	HYSPIN AWS 32	HYSPIN AWS 46	HYSPIN AWS 68	HYSPIN AWS 100
<b>ELF</b>	ELFOLNA 22 ELFOLNA DS 22	ELFOLNA 32 ELFOLNA DS 32	ELFOLNA 46 ELFOLNA DS 46	ELFOLNA 68 ELFOLNA DS 68	ELFOLNA 100 ELFOLNA DS 100
<b>ESSO</b>	NUTO H22	NUTO H32	NUTO H46	NUTO H68	NUTO H100
<b>FINA</b>	HYDRAN 22	HYDRAN 32	HYDRAN 46	HYDRAN 68	HYDRAN 100
<b>IP</b>	HYDROS OIL 22	HYDROS OIL 32	HYDROS OIL 46	HYDROS OIL 68	HYDROS OIL 100
<b>FUCHS</b>	RENOLIN MR5 RENOLIN B5	RENOLIN MR10 RENOLIN B10	RENOLIN MR15 RENOLIN B15	RENOLIN MR20 RENOLIN B20	RENOLIN MR30 RENOLIN B30V
<b>GULF</b>	Harmony 40A W	Harmony 43A W	Harmony 54A W	Harmony 60A W	
<b>Q8</b>	Haydn 22	Haydn, Holst, Hydraulic 32	Haydn, Holst, Hydraulic 46	Haydn, Holst, Hydraulic 68	Haydn, Holst, Hydraulic 100
<b>MOBIL</b>	DTE 22	DTE 24	DTE 25	DTE 26	DTE 27
<b>SHELL</b>	Tellus OI 22 Hydrol DO 22	Tellus OI 32 Hydrol DO 32	Tellus OI 46 Hydrol DO 46	Tellus OI 68 Hydrol DO 68	Tellus OI 100 Hydrol DO 100
<b>TOTAL</b>	Azolla ZS 22	Azolla ZS 32	Azolla ZS 46	Azolla ZS 68	Azolla ZS 100
<b>VERKOL</b>	Vesta HLP 22	Vesta HLP 32	Vesta HLP 4 6	Vesta HLP 68	Vesta HLP 100

## STARTING UP THE SYSTEM

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Before starting up the system, flush out both new systems and those that have undergone important repairs. Temporarily disconnect the actuators (cylinders - motors) and replace them with lengths of pipe. Remove the servovalves or other precision instruments and replace with appropriate by-pass plates. After flushing out, replace all components, taking particular care that the insides of the actuators are thoroughly clean.

Install hydraulic system away from sources of heat (i.e. furnaces) or shield them adequately.

Only remove the plugs immediately before connection to the consumers.

Fill the tank, filtering fluid through a separate portable filter unit.

Check that there are no leaks in the tank of water coming from heat exchangers or other sources and carry out any necessary repairs carefully, pre-filling the pump if possible.

When starting up for the first time check by hand that the pump rotates freely. Then loosen a delivery union and connection and check that oil is delivered from the tank to the pump (if a pump is started up when dry, it can easily seize). Then take the maximum pressure valve fitted on the delivery side of the pump to its minimum setting, to prevent pressure peaks during initial start-up.

Check that the power supply corresponds to the ratings plate.

Only after having performed these operations start up the motor for a few seconds, two or three times consecutively, to check that operation is regular and, in particular, that the pump rotates in the correct direction. Then check the level of oil in the tank and run the pump continually at minimum pressure to fill the circuit with oil and bleed air from the instruments and pipes (check the bleed valves), continually topping up to the normal level as oil is delivered into the circuit.

If possible, it is good practice to run the pump at low speed and pressures in the beginning in order to run in the system and only use the pump at full speed when overall operation is regular.

Before increasing the pressure setting of the maximum pressure valve to the maximum pressure contemplated for the system, also in order to check that the union seals are tight, make sure that the procedure of filling the circuit with oil has been completed: if there is no air in the circuit and a union breaks or becomes detached this does not usually cause serious damage, whilst if there are noteworthy amounts of air breakage can be dangerous at high pressures, with metal parts projected into the air due to sudden expansion of compressed air.

A few small air bubbles may remain in certain parts of the circuit (noticeable owing to irregular movements of consumers) if the bleed valves are not in the most suitable positions; this can be bled by loosening a few unions in the highest parts of the circuit. In any case, small air bubbles are removed automatically from the circuit after a few hours of operation, as air tends to mix with the oil to then be released in the tank.

Check that no foam forms in the tank as this indicates that air is seeping during pump intake (if the end of the return pipe to the tank is immersed in oil).

When using oil with a certain level of viscosity at very low ambient temperatures, during start-up the pump may run badly or noisily owing to excessive viscosity: in this case the oil used for start-up should be pre-heated before in some way (i.e. with an electric resistance) or the pump speed reduced. In small systems the oil can be heated by running the pump in short circuit at medium pressure for a short time before setting the system at work.

After a few hours of operation clean the filters, check the oil levels in the tank and carefully check that union seals are tight.

## MAINTENANCE

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Before performing maintenance make sure that the power supply is disconnected.

If carrying out programmed maintenance, make sure the filter cartridge is replaced (or the metal mesh filter media is cleaned) when the clogging indicator or visual checks show this is required.

Take and examine samples of fluid at regular intervals, to check whether the effects of impurities, heat, water and air call for stricter measures or the replacement of fluid.

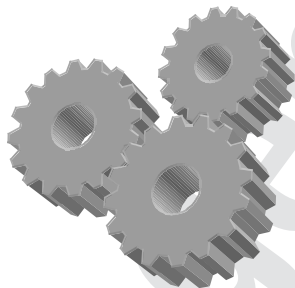
If the tank is emptied, carefully remove all impurities and, if necessary restore the protective paintwork of the tank (or any other protective measure contemplated).

After these operations, if it is not to be filled with oil immediately, close all the apertures. If it is to be filled, check that bleed valves with air filter, caps, etc., have been correctly fitted.

Guide given in table 1 below is extremely useful when carrying out maintenance.

The most common problems among those listed may be attributed to positions 1 - 5 - 11 - 12 - 16 - 17 - 23 - 28 - 29, highlighted in bold in our table. In the event of faulty operation, first check these points and after this go on to the subsequent checks, possibly in the order set down in the maintenance guide. If possible, avoid disassembling new instruments without authorisation as the manufacturer's guarantee becomes null and void.

If an oil accumulator is installed, check that the drain cock is open and that it is no longer under pressure before removing or opening the circuit.



**N.B.: We recommend that maintenance is carried out by skilled staff**



## FAULTS IN A HYDRAULIC SYSTEM AND WHAT CAUSES THEM

---

The probable causes of faults that can occur in the complete hydraulic system may be of external or internal origin.

### External causes

#### **Fault:**

#### Loss of dynamic or static torque

- a) wrong choice of fluid;
- b) safety valve set to values that are too low;
- c) safety valve blocked open;
- d) distributor valve blocked;
- e) pump does not deliver the required pressure;
- f) air circulation;
- g) blockages in the hydraulic system;
- h) connection between motor shaft and driven mechanism forced or not correctly aligned;
- i) incorrect pipe assembly.

#### Drop in speed

- a) pump does not deliver the required flow rate;
- b) blockages in the hydraulic system;
- c) valve blocked open.

#### Fault operation at low number of revolutions

- a) faulty hydraulic pump or circuit;
- b) motor shaft and driven mechanism connected incorrectly;
- c) pressure in auxiliary parts too low;

#### Overheating

- a) oil viscosity too high;
- b) throttling in the pipes;
- c) dump valves set to values that are too low;
- d) irregular operation of the cooling system or tank too small.

#### Level of drainage too high

1. low degree of oil viscosity due to wrong choice or excessive increase in the operating temperature.

#### Noise

- a) cavitation in the pump;
- b) air in the circuit.

Investigate any internal causes only after having made sure that there are none of the external causes above.

### Internal causes

#### **Fault:**

#### Loss of dynamic or static torque

- a) wear in the distributor or perhaps in the couplings;
- b) bearings fitted on the shaft incorrectly.

#### Drop in speed

- a) couplings worn with high degree of loss to drainage.

#### Faulty operation at low number of revolutions

- a) distributor worn;
- b) couplings worn.

#### High degree of loss to drainage

- a) distributor worn;
- b) couplings worn;
- c) distributor or cylinder gaskets faulty or incorrectly fitted.

#### Excessive wear

- a) foreign bodies in the oil (filters in bad condition);
- b) oil viscosity too low;
- c) pressure, speed or temperatures which exceed the contemplated maximums;
- d) air bubbles in the circuits.

#### Overheating

- a) oil viscosity too high;
- b) blow-by in the couplings

## GUIDE FOR MAINTENANCE OF HYDRAULIC SYSTEMS

Faults		Probable causes		Possible reasons
<b>INSUFFICIENT PRESSURE</b> or drop in pressure compared to the level contemplated in the circuit	1	Max. pressure valve half-open	1	a) Pressure set too low b) Wear of seal seats c) Impurities under the housings d) Breakage of the spring
	2	Pump faulty	2	See points 5 - 11
	3	Excessive internal leakage	3	a) Worn seals in cylinders or hydraulic motors b) Worn valves and distributors c) Oil viscosity too low
	4	Excessive loss of load	4	a) Oil viscosity too high b) Oil pipes too narrow c) Oil pipes partly clogged
<b>PUMP FAULTY</b> for no or scarce flow rate compared to normal values	5	Intake throttled	5	a) In the tank intake inlet b) In the intake unions c) In the pump shaft seal d) For intake of foamed oil
	6	Air intake	6	a) In the tank intake inlet b) In the intake unions c) In the pump shaft seal d) For intake of foamed oil
	7	Tank sealed hermetically	7	Air bleed valve in the tank blocked
	8	Faulty operation	8	a) Check the coupling b) Speed too high or too low
	9	Oil viscosity too high	9	See pump settings
	10	Pump faults	10	a) Internal gaskets broken b) Blades, caps or pistons jammed c) Head not clamped d) Broken internal parts to be replaced
	11	Pump excessively worn	11	Pump to be replaced
<b>POMPA RUMOROSA</b> (i.e. some gear pumps are always very noisy)	12	Cavitation	12	a) Intake throttled: see point 5 b) Viscosity level high— see point 9
	13	Air inlets	13	See point 6
	14	Internal wear	14	Too much play in the supports and caps
	15	Plant vibration	15	Faulty installation, resonance

## GUIDE FOR MAINTENANCE OF HYDRAULIC SYSTEMS

<b>OVERHEATING</b> with oil temperature rising above the safety limit of 50 to 60°C	<b>16</b>	Max. pressure too high	<b>16</b>	Excessive valve setting
	<b>17</b>	Power used without reason	<b>17</b>	a) Inefficient cut-off valve b) Short circuit at end of cycle not operating c) Hydraulic circuit to be modified
	<b>18</b>	Excessive internal leakage	<b>18</b>	See point 3
	<b>19</b>	Excessive loss of load	<b>19</b>	See point 4
	<b>20</b>	Insufficient oil capacity	<b>20</b>	Fit a larger oil tank
	<b>21</b>	Insufficient cooling	<b>21</b>	a) Add an artificial cooling device b) Any coolants not effective
	<b>22</b>	Excessive friction	<b>22</b>	a) Faulty internal pump assembly b) Lack of lubricant where contemplated c) Use of oil with low lubrication value
<b>INCORRECT MOVEMENTS</b> of hydraulically operated parts in relation to the cycle contemplated	<b>23</b>	Air in the circuit	<b>23</b>	a) Bleed the air bubbles in the high points b) Eliminate air intake - see point 6
	<b>24</b>	Valves blocked	<b>24</b>	a) Valves blocked closed by rubber or other substances b) Valves blocked half-open by impurities
	<b>25</b>	Cylinders blocked	<b>25</b>	a) Faulty internal cylinder assembly b) Normal loads to the axis not admissible c) Seizure of connection pins
	<b>26</b>	Excessive loss of load	<b>26</b>	See point 4
	<b>27</b>	Variable pressure to the accumulators	<b>27</b>	a) Insufficient accumulator capacity b) Greater demand from circuit for internal leaks
<b>EXCESSIVE WEAR</b> excessively quick in relation to the amount of effective operation and to service	<b>28</b>	Abrasives in oil	<b>28</b>	a) Oil too old b) Filters ineffective
	<b>29</b>	Insufficient lubrication	<b>29</b>	a) Poor quality of oil b) Oil excessively fluid at operating temperature
	<b>30</b>	Working pressure too high	<b>30</b>	In relation to the maximum admissible for pump and valves
	<b>31</b>	Faulty couplings	<b>31</b>	Abnormal strain on shafts or rods



HOSE SIZE				R.O.D.		O.D.		bar		BURST PRESSURE		MIN. BEND RADIUS		WEIGHT		FERRULE
				mm	Inch	mm	Inch	bar	psi	bar	psi	mm	Inch	g/m	lb/ft	
5	-3	4,8	3/16"	1,5	0,37	11,5	0,45	250	3620	1000	14500	89	3,50	195	0,13	MO3400-03
6	-4	6,4	1/4"	11,2	0,44	13,1	0,52	215	3240	900	13050	100	3,94	220	0,15	MO3400-04
8	-5	7,9	5/16"	12,8	0,50	14,8	0,58	215	3110	850	12320	114	4,49	270	0,18	MO3400-05
10	-6	1,5	3/8"	15,1	0,59	17,1	0,67	180	2610	720	10440	127	5,00	340	0,13	MO3400-06
12	-8	12,7	1/2"	18,1	0,71	20,1	0,79	140	2320	640	9260	178	7,01	410	0,17	MO3400-08
16	-10	15,1	5/8"	21,3	0,84	23,3	0,92	130	1880	520	7540	200	7,87	510	0,14	MO3400-10
19	-12	19,0	3/4"	25,3	1,00	27,3	1,07	105	1520	420	6090	240	9,45	620	0,42	MO3400-12
25	-14	25,4	1"	33,1	1,30	35,1	1,38	88	1270	350	5070	300	11,81	990	0,42	MO3400-16
31	-20	31,8	1-1/4"	40,6	1,60	43,3	1,70	63	910	250	3620	419	16,50	1250	0,84	MO3400-20
38	-24	38,1	1-1/2"	47,0	1,85	49,7	1,94	50	720	200	2900	500	19,69	1600	1,07	MO3400-24
51	-32	50,8	2"	60,4	2,38	63,1	2,48	40	580	160	2320	630	24,80	2200	1,47	MO3400-32
60	-38	60,0	2-3/8"	68,8	2,71	71,5	2,81	50	720	200	2900	650	25,59	2245	1,50	MO3400-38

**KEY PERFORMANCE / CARACTERÍSTICAS ESPECIALES**

EN/DIN rated working pressure ▪ Smooth cover FRAS approved (DN 5+12) ▪  
 Presión de trabajo acorde a Norma EN/DIN ▪ Cubierta lisa con aprobación FRAS (DN 5+12) ▪

**MAIN APPLICATIONS TYPES:** *Low-medium pressure lines, return lines*

**CONTINUOUS SERVICE:**  
 -40°F / +212°F -40°C / +100°C

**MAX OPERATING TEMPERATURE**  
 (Intermittent service):  
 257°F 125°C

**RECOMMENDED FLUIDS:** *mineral oils, vegetable and rape seed oils, glycol and polyglycol based oils, synthetic ester based oils, oils in aqueous emulsion, water, diesel fuel (up to 200°F 93°C)*

**PRINCIPALES TIPOS DE APLICACIÓN:**  
*Líneas de baja a mediana presión, líneas de retorno*

**SERVICIO CONTINUO:**  
 -40°F / +212°F -40°C / +100°C

**MÁXIMA TEMPERATURA DE OPERACIÓN**  
 (Servicio intermitente):  
 257°F 125°C

**FLUIDOS RECOMENDADOS:** *Acetate mineral, acetate vegetal y de colza, aceites basados en glicoles y poliglicoles, aceites con base en éster sintético, acetate en emulsión acuosa, agua, acetate diesel (hasta 200°F 93°C)*

**INSERT: MF2000 - MULTIFIT TYPE**

**TUBE:** Oil resistant synthetic rubber

**REINFORCEMENT:** One high tensile steel braid

**COVER:** Environment resistant synthetic rubber.

**Smooth cover FRAS approved (DN 5+12)**

**APPLICABLE SPECS.: EN 853 1SN -**

**SAE 100 R1AT - ISO 1436-1 1SN/R1AT**

**TYPE APPROVALS: ABS, BV, BWB, DNV, GL, GOST-R, KRS, LR, RINA**

**ESPIGA: MF2000 - TIPO MULTIFIT**

**TUBO:** Caucho sintético, resistente al aceite

**REFUERZO:** Una trenza de acero de alta resistencia

**CUBIERTA:** Caucho sintético resistente a la intemperie.

**Cubierta lisa con aprobación FRAS (DN 5+12)**

**ESPECIFICACIONES APLICABLES: EN 853 1SN -**

**SAE 100 R1AT - ISO 1436-1 1SN/R1AT**

**APROBACIONES: ABS, BV, BWB, DNV, GL, GOST-R, KRS, LR, RINA**



HOSE SIZE				R.O.D.		O.D.		MAX W.P.		BURST PRESSURE		MIN. BEND RADIUS		WEIGHT		FERRULE
				mm	inch	mm	inch	bar	psi	bar	psi	mm	inch	g/m	lb/ft	
5	-3	4,8	3/16"	11,3	0,44	13,3	0,51	415	6010	1650	23920	89	3,50	315	0,21	MO3400-03
6	-4	4,4	1/4"	12,7	0,50	14,7	0,58	400	5800	1600	23200	100	3,94	360	0,24	MO3400-04
8	-5	7,9	5/16"	14,3	0,56	16,3	0,64	350	5070	1400	20300	114	4,49	400	0,27	MO3400-05
10	-6	9,5	3/8"	16,7	0,66	18,7	0,74	330	4760	1320	19140	127	5,00	510	0,34	MO3400-06
12	-8	12,7	1/2"	19,8	0,78	21,8	0,86	275	3980	1100	15950	178	7,01	620	0,42	MO3400-08
16	-10	15,9	5/8"	23,0	0,91	25,0	0,98	250	3620	1000	14500	200	7,87	715	0,48	MO3400-10
19	-12	19,0	3/4"	27,0	1,06	29,0	1,14	215	3110	860	12470	240	9,45	955	0,64	MO3400-12
25	-16	25,4	1"	34,8	1,37	36,8	1,45	165	2390	650	9420	300	11,81	1320	0,88	MO3400-16
31	-20	31,8	1-1/4"	44,3	1,74	47,0	1,85	125	1810	500	7250	419	16,50	1965	1,32	MO3400-20
38	-24	38,1	1-1/2"	50,7	2,00	53,4	2,10	90	1300	360	5220	500	19,69	2265	1,52	MO3400-24
51	-32	50,8	2"	63,5	2,50	66,2	2,61	80	1160	320	4640	630	24,80	3115	2,09	MO3400-32
60	-38	60,0	2-3/8"	68,8	2,71	71,5	2,81	90	1300	360	5220	650	25,59	2660	1,78	MO3400-38

**KEY PERFORMANCE / CARACTERÍSTICAS ESPECIALES**

EN/DIN rated working pressure ▪ Wide range of type approvals available ▪  
 Presión de trabajo del rango EN/DIN ▪ Amplio rango de aprobaciones y normas ▪

**MAIN APPLICATIONS TYPES:** Medium-high pressure lines

**CONTINUOUS SERVICE:**  
 -40°F / +212°F  
 -40°C / +100°C

**MAX OPERATING TEMPERATURE**  
 (Intermittent service):  
 257°F 125°C

**RECOMMENDED FLUIDS:** Mineral oils, vegetable and rape seed oils, glycol and polyglycol based oils, synthetic ester based oils, oils in aqueous emulsion, water, diesel fuel (up to 200°F 93°C)

**PRINCIPALES TIPOS DE APLICACIÓN:**  
 Líneas de mediana a alta presión

**SERVICIO CONTINUO:**  
 -40°F / +212°F  
 -40°C / +100°C

**MÁXIMA TEMPERATURA DE OPERACIÓN**  
 (Servicio intermitente):  
 257°F 125°C

**FLUIDOS RECOMENDADOS:** Aceite mineral, aceite vegetal y de colza, aceites basados en glicoles y poliglicoles, aceites con base en éster sintético, aceite en emulsión acuosa, agua, aceite diesel (hasta 200°F 93°C)

**INSERT: MF2000 - MULTIFIT TYPE**

**TUBE:** Oil resistant synthetic rubber

**REINFORCEMENT:** Two high tensile steel braids

**COVER:** Environment resistant synthetic rubber

**APPLICABLE SPECS.:** EN 853 2SN -

SAE 100 R2AT - ISO 1436-1 2SN/R2AT

**TYPE APPROVALS:** ABS, BV, BWB, DNV, GL, GOST-R, KRS, LR, RINA

**ESPIGA: MF2000 - TIPO MULTIFIT**

**TUBO:** Caucho sintético, resistente al aceite.

**REFUERZO:** Dos trenzas de acero de alta resistencia

**CUBIERTA:** Caucho sintético resistente a la intemperie

**ESPECIFICACIONES APLICABLES:** EN 853 2SN -

SAE 100 R2AT - ISO 1436-1 2SN/R2AT

**APROBACIONES:** ABS, BV, BWB, DNV, GL, GOST-R, KRS, LR, RINA

# GOLDENSPIR™/4SP

EN 856 4SP



HOSE SIZE																
				R.O.D.		O.D.		MAX W.P.		BURST PRESSURE		MIN. BEND RADIUS		WEIGHT		FERRULE
DH	dash	mm	inch	mm	inch	mm	inch	bar	psi	bar	psi	mm	inch	g/m	lb/ft	
6	-4	6,4	1/4"	14,7	0,58	17,8	0,70	500	7250	1400	34800	100	3,94	615	0,41	M00110-04
10	-6	9,5	3/8"	17,6	0,69	21,3	0,84	460	6670	2100	30450	110	4,33	780	0,52	M00110-06
12	-8	12,7	1/2"	20,3	0,80	24,4	0,96	415	6160	1900	27550	120	4,72	930	0,62	M00110-08
16	-10	15,9	5/8"	23,7	0,93	28,1	1,11	400	5800	1600	23200	140	5,51	1140	0,76	M00110-10
19	-12	19,0	3/4"	28,2	1,11	32,0	1,26	380	5510	1600	23200	170	6,49	1510	1,02	M00120-12
25	-16	25,4	1"	35,0	1,38	39,0	1,54	310	4640	1400	20300	340	13,39	1970	1,32	M00120-16
31	-20	31,8	1-1/4"	46,1	1,81	49,9	1,96	210	3040	1250	18120	460	18,11	3035	2,03	M00120-20
38	-24	38,1	1-1/2"	53,4	2,06	57,0	2,24	185	2680	1000	14500	560	22,05	3650	2,45	M00110-24
51	-32	50,8	2"	65,4	2,57	70,8	2,79	175	2530	1000	14500	660	25,98	5330	3,57	M00110-32

## KEY PERFORMANCE / CARACTERÍSTICAS ESPECIALES

Approved 1.000.000 impulse cycles ▪ Over standard pressure resistance ▪ **bio** Biological and mineral oils compatibility ▪

Aprobada hasta 1.000.000 de ciclos de impulso ▪ Resistencia de presión superior a estandar ▪ **bio** Compatible con aceites minerales y biológicos ▪

**MAIN APPLICATIONS TYPES:** Very high pressure power lines

**CONTINUOUS SERVICE:**

-40°F / +212°F

-40°C / +100°C

**MAX OPERATING TEMPERATURE**

(Intermittent service):

257°F 125°C

**RECOMMENDED FLUIDS:** Mineral oils, vegetable oils and synthetic ester based oils (up to 212°F 100°C), glycols and polyglycols, mineral oils in aqueous emulsion, water

**PRINCIPALES TIPOS DE APLICACIÓN:**

Líneas de muy alta presión

**SERVICIO CONTINUO:**

-40°F / +212°F

-40°C / +100°C

**MÁXIMA TEMPERATURA DE OPERACIÓN**

(Servicio intermitente):

257°F 125°C

**FLUIDOS RECOMENDADOS:** Aceite mineral, aceite vegetal y aceite basado en éster sintético (hasta 212°F 100°C), glicoles y poliglicoles, aceite mineral en emulsión acuosa, agua

INSERT: MF2000 - MULTIFIT TYPE

TUBE: Oil resistant synthetic rubber

REINFORCEMENT: Four high tensile steel spirals

COVER: Environment resistant synthetic rubber.

MSHA approval

APPLICABLE SPECS.: EN 856 4SP - ISO 3862-1 4SP

TYPE APPROVALS: ABS, BV, BWB, DNV, GL, GOST-R, HBL, KRS, LR, RINA

ESPIGA: MF2000 - TIPO MULTIFIT

TUBO: Caucho sintético, resistente al aceite

REFUERZO: 4 espirales de acero de alta resistencia

CUBIERTA: Caucho sintético resistente al ambiente.

Aprobación MSHA

ESPECIFICACIONES APLICABLES: EN 856 4SP -

ISO 3862-1 4SP

APROBACIONES: ABS, BV, BWB, DNV, GL, GOST-R, HBL, KRS, LR, RINA

# GOLDENSPIR™/4SH

## EN 856 4SH



HOSE SIZE				R.O.D.		O.D.		bar		BURST PRESSURE		MIN. BEND RADIUS		kg		FERRULE
				mm	inch	mm	inch	bar	psi	bar	psi	mm	inch	g/m	lb/ft	
19	-12	19,0	3/4"	24,2	1,11	32,0	1,24	410	4010	1750	25370	210	8,17	1550	1,04	M01300-12
25	-14	25,4	1"	35,1	1,38	38,1	1,50	385	5580	1750	25370	220	8,66	1085	1,40	M01300-16
31	-20	31,8	1-1/4"	42,2	1,66	45,2	1,78	350	5070	1400	20300	420	16,50	1480	1,66	M01400-20
38	-24	38,1	1-1/2"	48,1	1,93	53,5	2,11	300	4350	1250	18120	560	22,05	3315	2,13	M01400-24
51	-32	50,8	2"	63,5	2,50	68,0	2,68	250	3610	1000	14500	700	27,56	4580	3,07	M01400-32



### KEY PERFORMANCE / CARACTERÍSTICAS ESPECIALES

Approved 1.000.000 flexing impulse cycles ▪ Over standard pressure resistance ▪ **bio** Biological and mineral oils compatibility ▪

Aprobada hasta 1.000.000 de ciclos de impulso flexibles ▪ Resistencia de presión superior a estándar ▪ **bio** Compatible con aceites minerales y biológicos ▪

**MAIN APPLICATIONS TYPES:** Very high pressure power lines

**CONTINUOUS SERVICE:**

-40°F / +212°F  
-40°C / +100°C

**MAX OPERATING TEMPERATURE**

(Intermittent service):  
257°F 125°C

**RECOMMENDED FLUIDS:** Mineral oils, vegetable oils and synthetic ester based oils (up to 212°F 100°C), glycols and polyglycols, mineral oils in aqueous emulsion, water

**PRINCIPALES TIPOS DE APLICACIÓN:**

Líneas de muy alta presión

**SERVICIO CONTINUO:**

-40°F / +212°F  
-40°C / +100°C

**MÁXIMA TEMPERATURA DE OPERACIÓN**

(Servicio intermitente):  
257°F 125°C

**FLUIDOS RECOMENDADOS:** Aceite mineral, aceite vegetal y aceite basado en éster sintético (hasta 212°F 100°C), glicoles y poliglicoles, aceite mineral en emulsión acuosa, agua

INSERT: MF2000 - INTERLOCK TYPE

TUBE: Oil resistant synthetic rubber

REINFORCEMENT: Four high tensile steel spirals

COVER: Environment resistant synthetic rubber.

MSHA approval

APPLICABLE SPECS.: EN 856 4SH - ISO 3862-1 4SH

TYPE APPROVALS: ABS, BV, BWB, DNV, GL, GOST-R, KRS, LR, RINA

ESPIGA: MF2000 - TIPO INTERLOCK

TUBO: Caucho sintético, resistente al aceite.

REFUERZO: 4 espirales de acero de alta resistencia

CUBIERTA: Caucho sintético resistente al ambiente.

Aprobación MSHA

ESPECIFICACIONES APLICABLES: EN 856 4SH - ISO 3862-1 4SH

APROBACIONES: ABS, BV, BWB, DNV, GL, GOST-R, KRS, LR, RINA