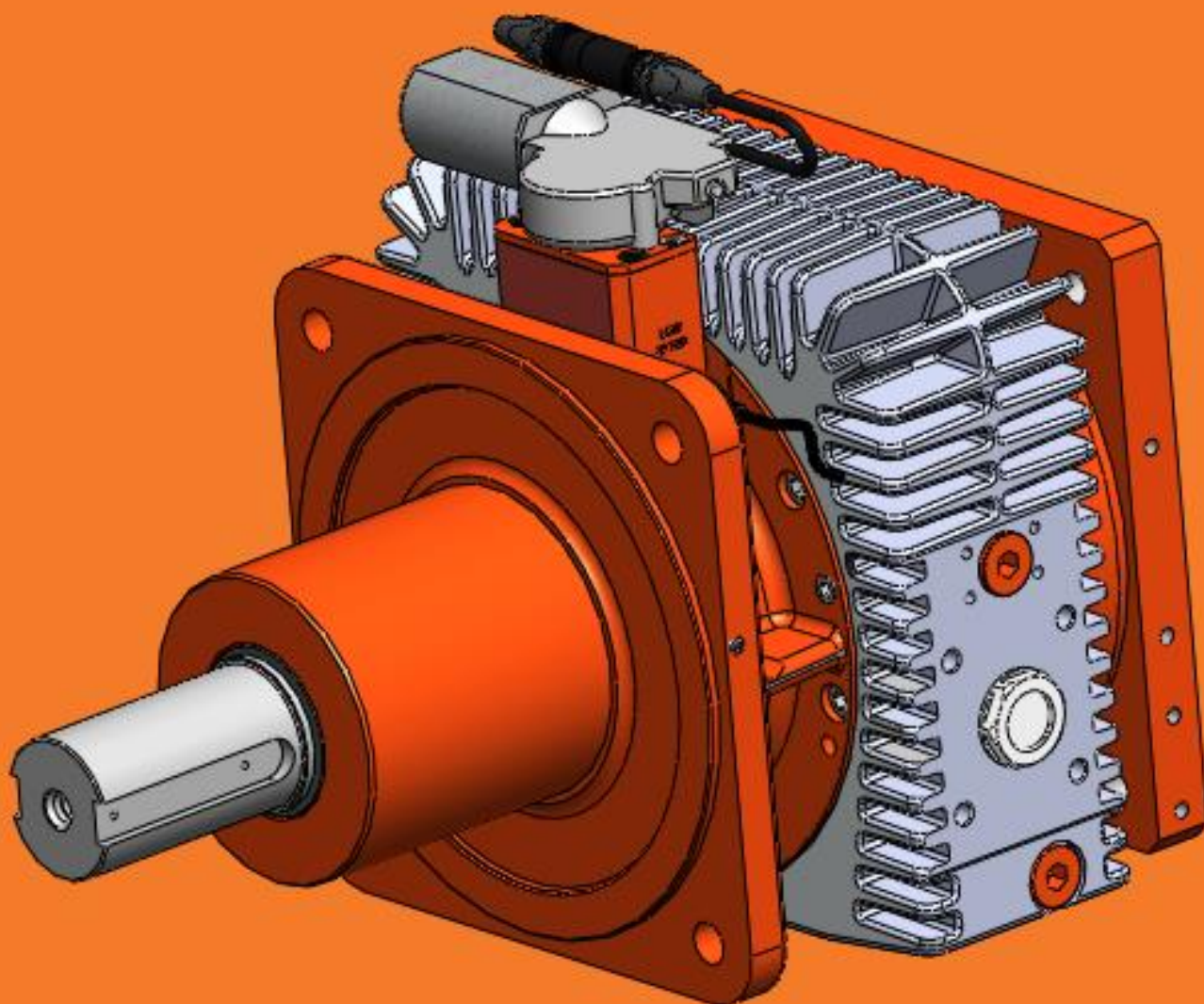


MSD 12 / 35 / 60

Mounting, Setup and Maintenance Instructions



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1 INTRODUCTION

The gearbox will give you complete satisfaction if all of the following mounting, operating and maintenance instructions are respected.

This gearbox is delivered:

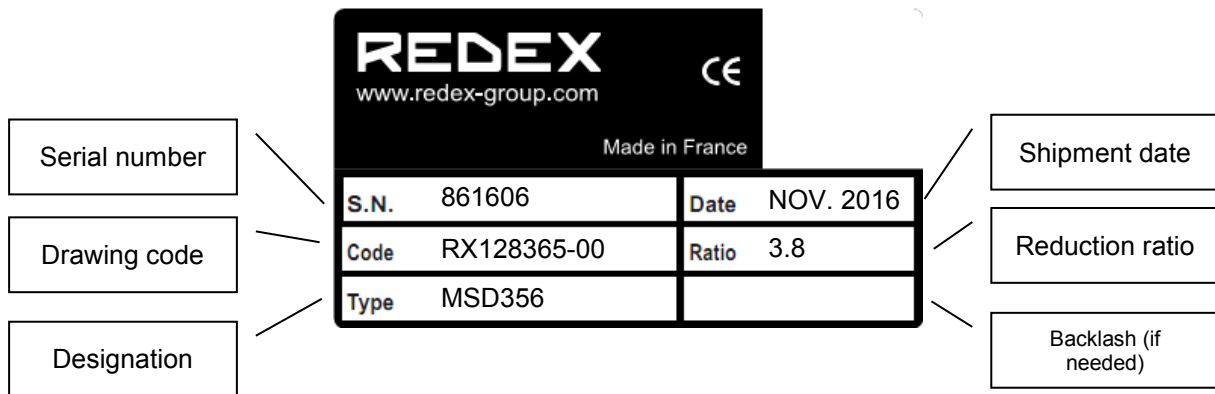
- With technical and dimensional characteristics in accordance with the technical data and the standard catalogue
- Fully tested (leakage, speed change motoreducer, noise level, vibration, temperature)
- Ready to be mounted

1.1 Life expectancy

The gearbox is designed with 15 000 hours calculation basis. Depending on the safety factors and application duty cycle, the life of the gearbox can be over 50 000 hours.

1.2 Gearbox identification

Each unit can be identified through its identification plate and the serial number indicated on it. The serial number must be given for any correspondence on a particular unit.



2 PACKAGING AND HANDLING

2.1 Packaging specifications

Gearboxes are delivered packed in wooden boxes, ready to pull out. If necessary, different parts delivered with gearboxes are wrapped individually and packed in the same wooden box. Package handling must be performed as indicated on the packaging.

2.2 Storage

Gearboxes are delivered wrapped and greased for 1 month anti-corrosion protection. Gearboxes which are not installed shortly after receipt should be stored in a dry atmosphere with temperature between 0°C & 40°C. The gearbox unit must be filled completely with oil for storage, and all machined external surfaces must be covered with an antioxidant protection.

2.3 Handling

Handling must be done with appropriate equipment such as webbing sling and shackles, or lifting chains.



3 MOTOR MOUNTING

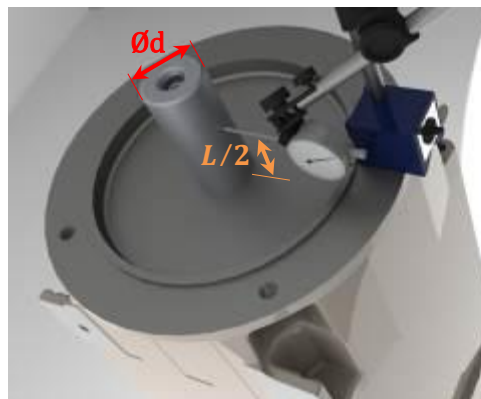
We recommend the installation of the gearbox to the machine frame **with the motor** to facilitate the implementation on the machine

3.1 Preliminary dimensional checking of the motor

3.1.1 Run out checking of the motor

- A. Clean and degrease the motor output shaft, flange and pilot diameter
- B. Put the motor onto a table
- C. The motor must respect DIN 42.955 class R; check the concentricity of the motor shaft with a comparator

Shaft diameter d (mm)	Radial run-out (mm)
$18 \leq d < 30$	≤ 0.021
$30 \leq d < 50$	≤ 0.025
$50 \leq d < 80$	$\leq 0,030$

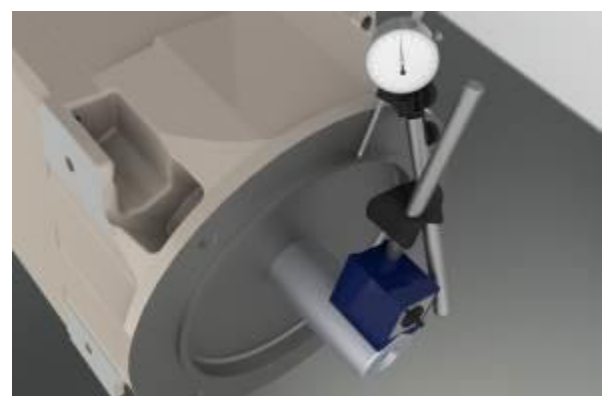


Shaft radial run-out measurement

Pilot diameter b_1 (mm)	Max. axial face run-out	Pilot radial run-out (mm)
$100 \leq b_1 \leq 230$	$\leq 0,040$	$\leq 0,040$
$230 \leq b_1 \leq 450$	$\leq 0,050$	$\leq 0,050$
$450 \leq b_1 \leq 800$	$\leq 0,063$	$\leq 0,063$



Face axial run-out measurement



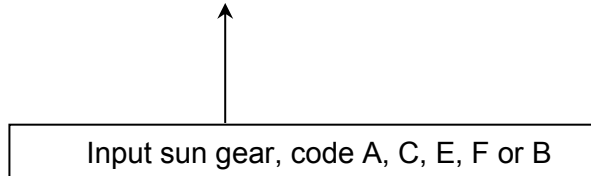
Pilot radial run-out measurement

The balancing of the input sun gear of the gearbox has been specified on order. This balancing type must be in accordance with the motor, according to following rules:

Motor (output shaft)	MSD (input sun gear)
Half key balancing	Half key balancing
Without key balancing	Full key balancing
Full key balancing	Without key balancing (usually 2 keyways)

3.2 Assembly of the input sun gear onto the motor

MSDXXX . **A** H 2 G . 3,8 M2 . 21J42 . A . S2



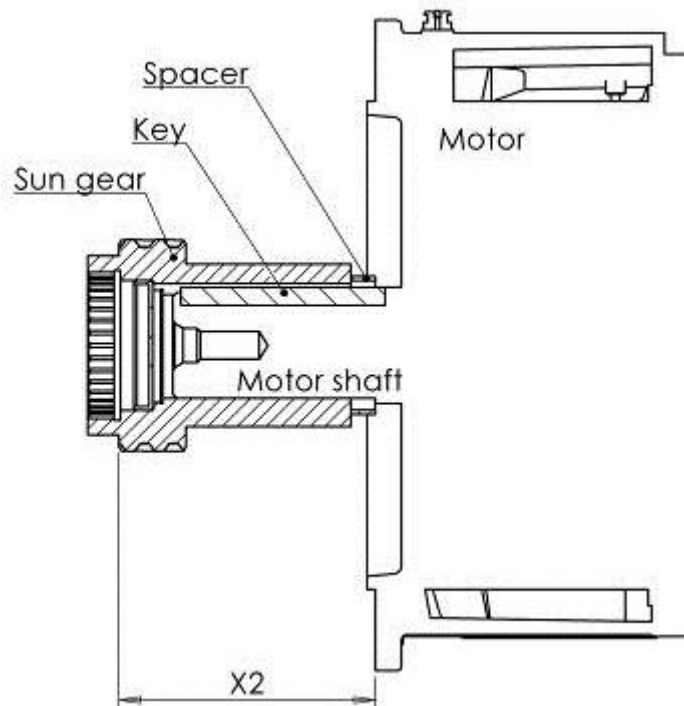
Input sun gear option	A	C	E	F	B
Chapter reference	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5

The sun gear is delivered bored and keyed in accordance with motor specifications.
If it is compression coupling on the input sun gear, see chapter 3.2.6.
It is separately delivered from the gearbox and has to be mounted onto the motor shaft.

3.2.1 "A" input flange code (input sun gear without seal, without bearing)

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . A . S2

- A. Put the motor horizontally on a table
- B. Clean and degrease the motor shaft and the bore of the MSD input sun gear
- C. Adjust the key to the input sun gear keyway and to the motor shaft keyway
- D. Lightly grease the motor shaft using an anti-fretting paste
- E. If a spacer is delivered with the gearbox, Fit it on the motor shaft against the shaft shoulder
- F. Fit the key on the shaft
- G. Heat the input sun gear up to 80-100°C
- H. Fit the input sun gear against the spacer or the shoulder according to the sketch.
- I. Measure the length X_2 between the motor mounting surface and the input sun gear as shown on the picture below.

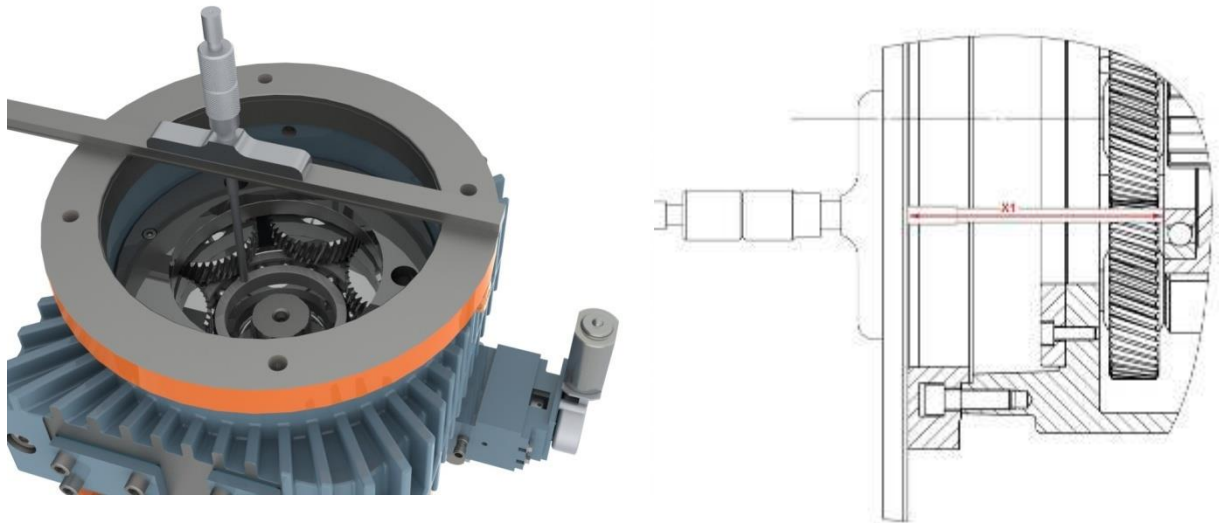


WARNING!



NEVER REMOVE THE SNAP RING OR THE PLUG WHICH IS INSIDE THE BORE OF THE SUN GEAR.

- J. Measure the length X_1 between the output sun gear bearing and the MSD motor flange mounting surface, as shown in the picture below.



- K. Compare the values of X_1 and X_2 . X_2 must be less than X_1 with a tolerance of “e”, according to the following table. ($X_2 + e < X_1$)

	e (mm)
MSD12	From 0.05 to 0.80
MSD35	From 0.05 to 0.90
MSD60	From 0.05 to 0.85

- L. If necessary, grind the spacer to adjust the X_2 dimension.
For information, the theoretical values of X_2 are shown in the table below.

	Shaft length (mm)	X_2 Theoretical (mm)
MSD12	80	82.2 0 -0,35
		84,3 0 -0,35
MSD35	110	117,3 0 -0,35
	140	147,3 0 -0,35
MSD60	140	154 0 -0,35
	170	174 0 -0,35

- M. To validate the assembly of the sun gear, re-measure the shaft radial run-out tolerances as indicated on pictures below.

Shaft diameter d (mm)	Radial run-out (mm)
$18 \leq d < 30$	≤ 0.031
$30 \leq d < 50$	≤ 0.035
$50 \leq d < 80$	$\leq 0,040$



Shaft radial run-out measurement

- N. Proceed to the motor mounting (see **chapter 3.3**)

3.2.2 "C" input flange code (input sun gear without seal, with bearing)

MSDXXX . C H 2 G . 3,8 M2 . 21J42 . A . S2

Make sure the motor have sealing on his shaft.


- A. Put the motor horizontally on a table
- B. Clean and degrease the motor shaft and the bore of the MSD input sun gear
- C. Adjust the key to the input sun gear keyway and to the motor shaft keyway
- D. Lightly grease the motor shaft using an anti-fretting paste
- E. Fit the key on the shaft
- F. Proceed to the motor mounting (see **chapter 3.3**)

3.2.3 "E" input flange code (input sun gear with seal, without bearing)

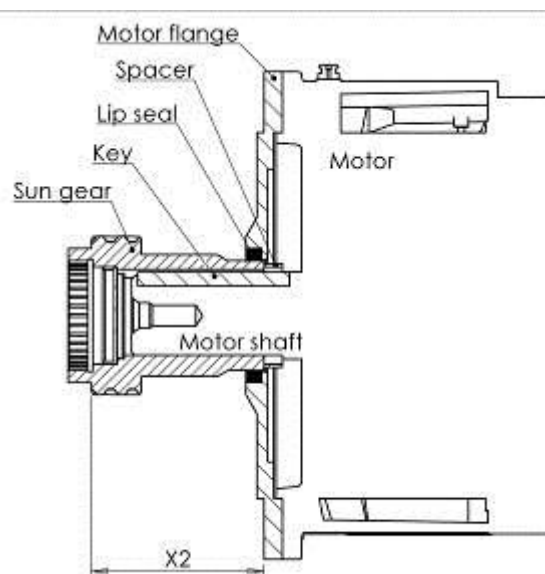
MSDXXX . E H 2 G . 3,8 M2 . 21J42 . A . S2

- A. Put the motor horizontally on a table
- B. Clean and degrease the motor shaft and the bore of the MSD input sun gear
- C. Adjust the key to the input sun gear keyway and to the motor shaft keyway
- D. Lightly grease the motor shaft using an anti-fretting paste
- E. If a spacer is delivered with the gearbox, Fit it on the motor shaft against the shaft shoulder
- F. Bring the sealing flange with his seal onto the motor
- G. Fit the key on the shaft
- H. Heat the input sun gear up to 80-100°C
- I. Fit the input sun gear against the spacer or the shoulder according to the sketch.

WARNING!

 **Avoid damaging the lip of the seal during this operation!**

- J. Measure the length X_2 between the motor mounting surface and the input sun gear as shown on the picture below.

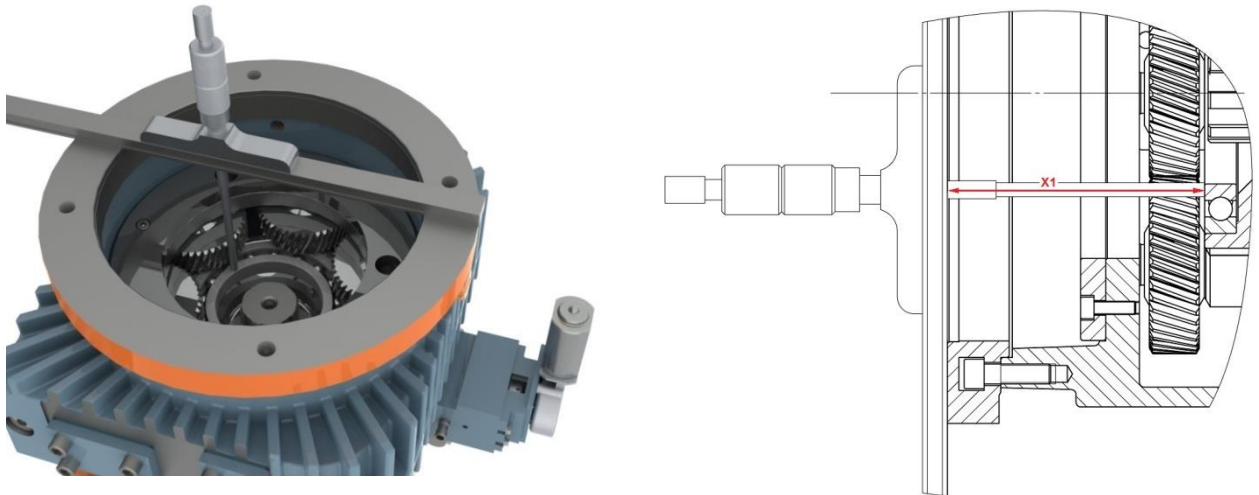


WARNING!



Never remove the snap ring or the plug which is inside the bore of the sun gear.

- K. Measure the length X_1 between the output sun gear bearing and the MSD motor flange mounting surface, as shown in the picture below.



- L. Compare the values of X_1 and X_2 . X_2 must be less than X_1 with a tolerance of "e", according to the following table. ($X_2 + e < X_1$)

	e (mm)
MSD12	From 0.05 to 0.80
MSD35	From 0.05 to 0.90
MSD60	From 0.05 to 0.85

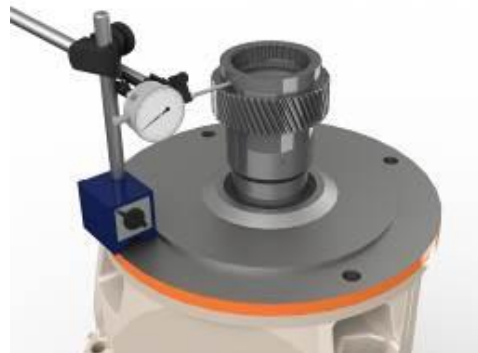
- M. If necessary, grind the spacer to adjust the X_2 dimension.

For information, the theoretical values of X_2 are shown in the table below.

	Shaft length (mm)	X_2 Theoretical (mm)
MSD12	80	82.2 0
		-0,35
MSD35	80	84,3 0
		-0,35
	110	117,3 0
		-0,35
MSD60	140	147,3 0
		-0,35
MSD60	170	154 0
		-0,35
MSD60	170	174 0
		-0,35

- N. To validate the assembly of the sun gear, re-measure the shaft radial run-out tolerances as indicated on pictures below.

Shaft diameter d (mm)	Radial run-out (mm)
$18 \leq d < 30$	≤ 0.031
$30 \leq d < 50$	≤ 0.035
$50 \leq d < 80$	$\leq 0,040$



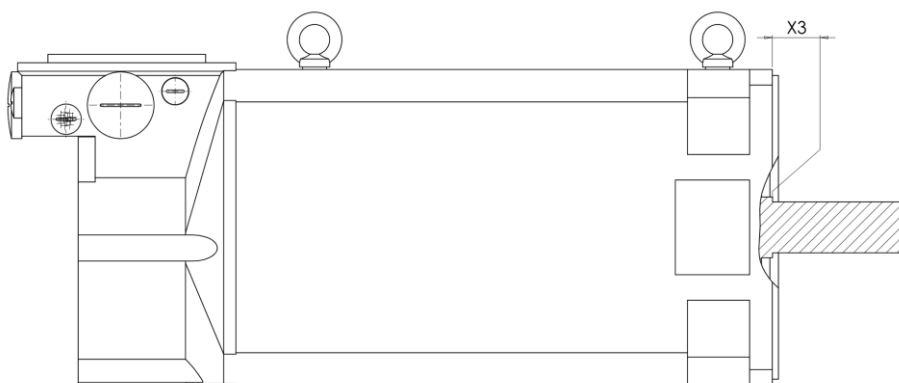
Shaft radial run-out measurement

- O. Proceed to the motor mounting (see **chapter 3.3**)

3.2.4 "F" input flange code (input sun gear with seal, with bearing)

MSDXXX . F H 2 G . 3,8 M2 . 21J42 . A . S2

- Put the motor horizontally on a table
- Clean and degrease the motor shaft
- Adjust the key to the input sun gear keyway and to the motor shaft keyway
- Fit the key on the shaft
- Measure on the motor the length X3 between the motor shaft shoulder and the flange mounting surface, as shown in the picture below.



WARNING!



The X3 value must be ≤ 0 , if this one is positive, grind the spacer of the MSD of the X3 value.

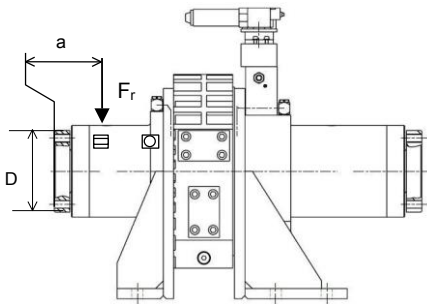
- F. Lightly grease the motor shaft using an anti-fretting paste
- G. Proceed to the motor mounting (see **chapter 3.3**)

3.2.5 "B" input bearing code (input sun gear supported by a bearing housing)

MSDXXX . B H 2 G . 3,8 M2 . A . A . S2

3.2.5.1 "B" input bearing code with flange A

Radial Load capacity



Maximum admissible radial load (Calculation basis 15 000 hours)		
Type / Size	a	Fr at 370 rpm
MSD12	38 mm	7100 N
MSD35	50 mm	14200 N
MSD60	75 mm	90000 N

For special design those data are subject to change. Always refer to specific application data.

3.2.5.2 "B" input bearing code with plain shaft B

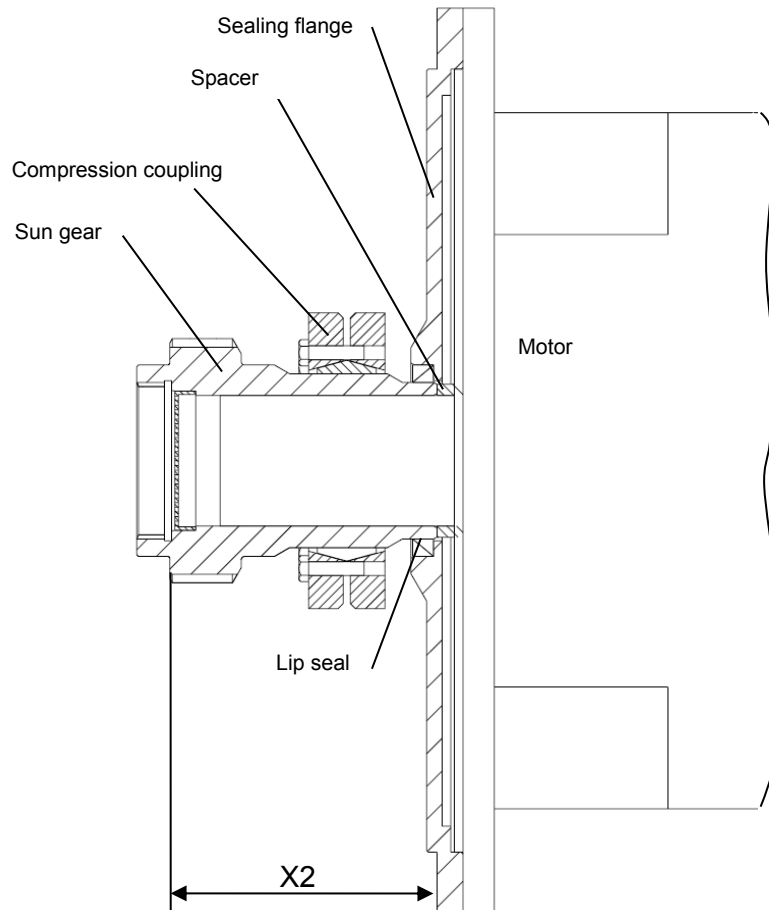
MSD gearbox can optionally be delivered with plain (or keyed) output shaft. Consult your nearest REDEX Agent for more details.

3.2.6 Special input sun gear with compression coupling (L)

3.2.6.1 "A" or "E" input flange code (without bearing)

MSDXXX . ^{A/E} H 2 G . 3,8 M2 . 21L42 . A . S2

- A. Put the motor horizontally on a table
- B. Clean and degrease the motor shaft and the bore of the MSD input sun gear
- C. Bring the spacer and the sealing flange with his seal onto the motor (if you have one)
- D. Fit the input sun gear against the spacer or the shoulder
- E. Tighten the compression coupling screw
- F. Check the length X_2 between the motor mounting surface and the input sun gear as shown on the picture below.(see **chapter 3.2.1.L**)



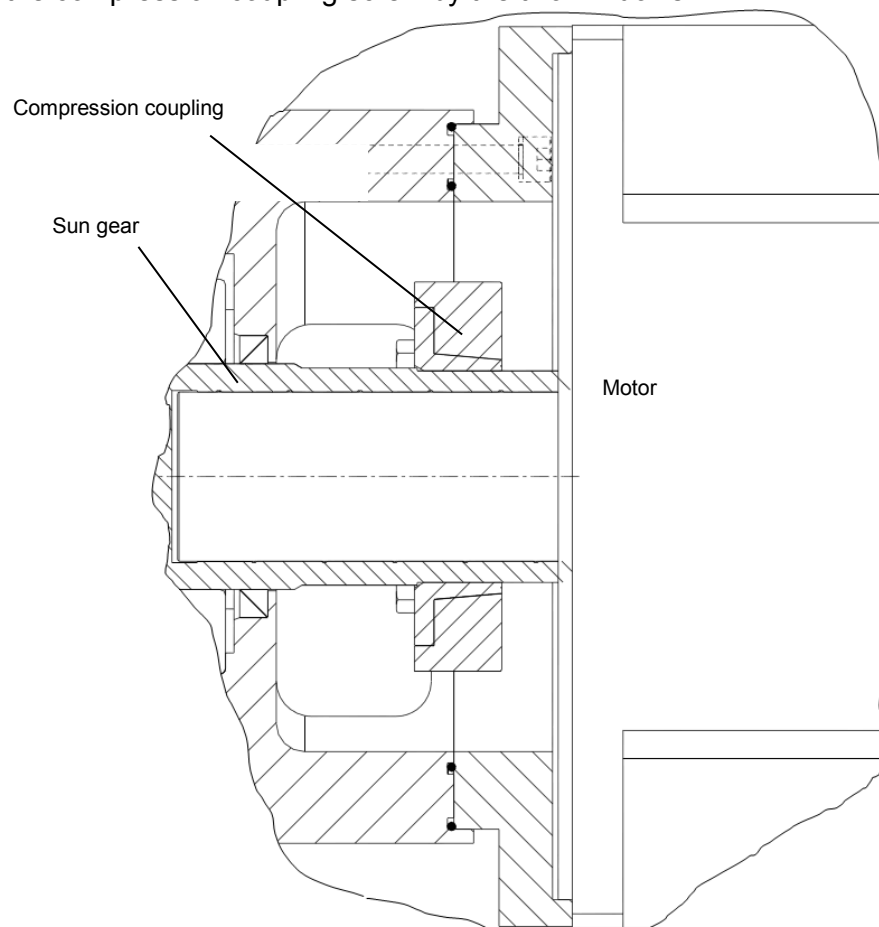
3.2.6.2 "C" or "F" input flange code (with bearing)

MSDXXX . ^C/_F H 2 G . 3,8 M2 . 21L42 . A . S2

- A. Put the motor horizontally on a table
- B. Clean and degrease the motor shaft and the bore of the MSD input sun gear
- C. Bring the MSD unit level with the motor axis in order to flange the unit on the motor.
- D. Tighten the motor mounting screws for final securing of the motor to the MSD unit to the appropriate tightening.

Screw type Class 12.9	Tightening torque (N.m)
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690

- E. Tighten the compression coupling screw by the two windows



3.3 Mounting of the gearbox onto the motor

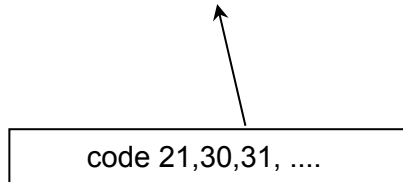
MSDXXX . A H 2 G . 3,8 M2 . **21**J42 . A . S2



Input flange option	21,30,31,	00
Chapter reference	3.3.1	3.3.2

3.3.1 Gearbox with motor flange

MSDXXX . A H 2 G . 3,8 M2 . **21**J42 . A . S2



- A. Put the motor horizontally on the table
- B. Completely degrease the MSD and motor contact surfaces
- C. Insure the sealing of the system. Refer to the following pictures.

	Motor pilot diameter >	Motor pilot diameter <
MSD12	169mm	
MSD35	248mm	
MSD60	360mm	
Instructions	<p>Put a continuous seal seam on the motor reference surface; this seam must be 3-4 mm thick minimum and begin in the corner of pilot diameter.</p>	<p>Put a continuous seal seam on the MSD flange surface; this seam must be 3-4 mm thick minimum and surround the fixing holes.</p>

We recommend the following sealants:

Recommended sealants	
GEB	Gebsicone S Translucide
RUBSON	Mastique Silicone Incolore
LOCTITE	Silcomet INCOLORE

- D. Bring the MSD unit level with the motor axis in order to flange the unit on the motor. Rotate the output MSD shaft for perfect engagement of the gear teeth during mounting.

WARNING!



Avoid teeth impact during this operation!

- E. Tighten the motor mounting screws for final securing of the motor to the MSD unit to the appropriate tightening.

Screw type Class 12.9	Tightening torque (N.m)
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690

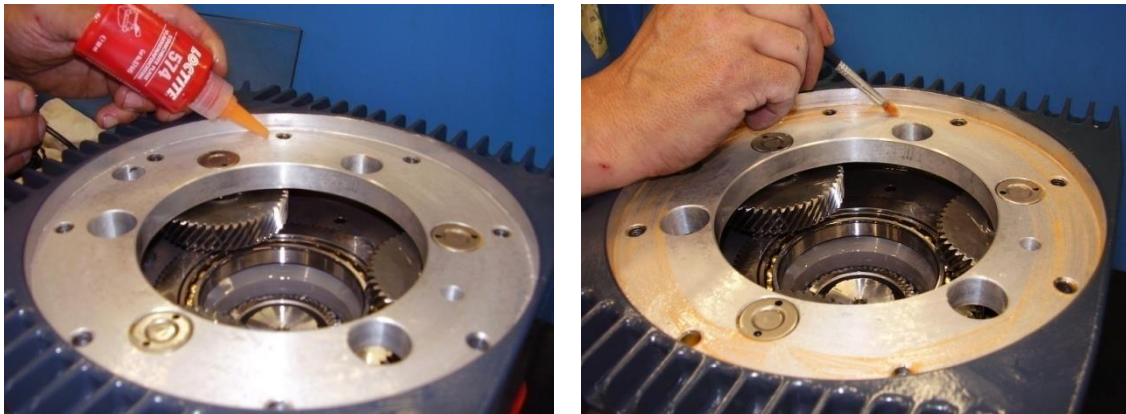


3.3.2 Gearbox without motor flange

MSDXXX . A H 2 G . 3,8 M2 . 00J42 . A . S2

The 2 input flanges (intermediate flange and customer's motor flange) must be sealed before being mounted on the gearbox. The following instructions must be followed:

- A. Clean and degrease all surfaces.
- B. Seal the gearbox input flange (see example on the pictures below).



Sealing of the housing before mounting the intermediate flange.

- C. Bring the intermediate flange.
- D. Seal the intermediate flange (see example on the pictures below).



Sealing of the intermediate flange before mounting the motor flange.

- E. Bring the motor flange onto the intermediate flange.
- F. Tighten the screws to the appropriate tightening torque (see table).

	SEALANT	SCREW	TIGHTENING TORQUE
MSD12	LOCTITE 574	CHC M12	145 N.m
MSD35		CHC M16	355 N.m
MSD60		CHC M16	355 N.m

- G. Put the motor horizontally on a table
- H. Completely degrease the MSD and motor areas of support
- I. Insure the sealing of the system. Refer to the following pictures.

	Motor pilot diameter >	Motor pilot diameter <
MSD12	169mm	
MSD35	248mm	
MSD60	360mm	
Instructions	<p>The diagrams show the sealant application process for two cases: 'Motor pilot diameter >' and 'Motor pilot diameter <'. Each case includes a side view of the gearbox and motor assembly with a sealant bead applied to the motor reference surface, and a cross-sectional view showing the sealant filling the gap between the gearbox and motor. Labels include 'Sealant', 'Gearbox', and 'Motor'.</p>	
	<p>Put a continuous seal seam on the motor reference surface; this seam must be 3-4 mm tick minimum and begin in the angle of pilot diameter.</p> <p>Put a continuous seal seam on the MSD flange surface; this seam must be 3-4 mm tick minimum and surround the fixing holes.</p>	

We recommend the following sealants:

Recommended sealants	
GEB	Gebsicone S Translucide
RUBSON	Mastique Silicone Incolore
LOCTITE	Silcomet INCOLORE

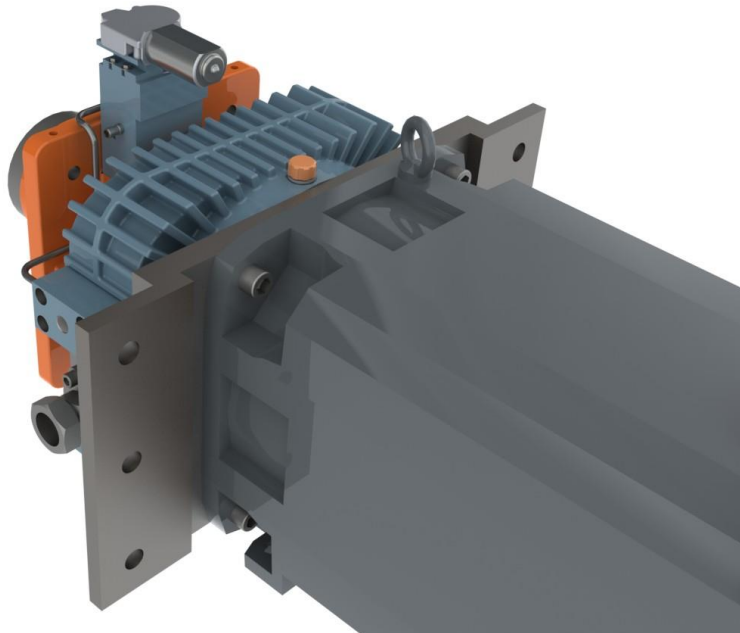
- J. Match the MSD unit axis with the motor one in order to mount the unit on the motor. Slightly rotate the output MSD shaft for perfect engagement of the gear teeth during mounting.

WARNING!

Avoid teeth impact during this operation!

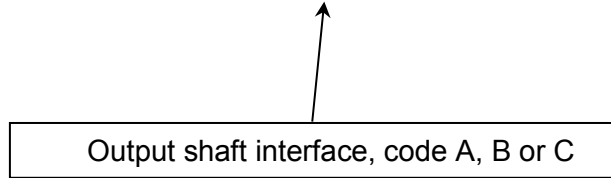
- K. Tighten with the appropriate torque the screws for final securing of the motor to the MSD unit.

Screw type Class 12.9	Tightening torque (N.m)
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690



4 MOUNTING OF THE GEARBOX ONTO THE MACHINE

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . **A** . S2



Output shaft interface	A	B	C
Chapter reference	4.1	4.2	4.3

4.1 "A" output shaft interface (with flange)

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . **A** . S2

The pulley must be balanced following G6.3 grade to insure low vibration while operating.
The pulley must be centered on the output flange external diameter and secured with appropriate screws.

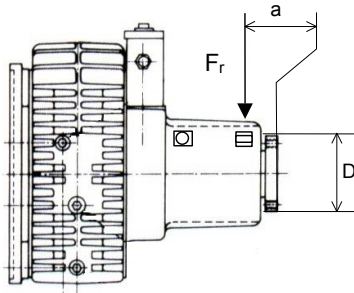
	Output flange external diameter (D)	Pulley fixing screws (class 12.9 min.)	Tightening torque
MSD12	70j6	8xM8 on $\varnothing 55\pm 0.1$	41 Nm
MSD35	90j6	8xM8 on $\varnothing 72\pm 0.1$	41 Nm
MSD60	160j6	12xM16 on $\varnothing 130\pm 0.1$	355 Nm

WARNING!



While tensioning the belt, respect the maximum radial load admissible by the bearings of output shaft.

Radial Load capacity on output



Maximum admissible radial load (Calculation basis 15 000 hours)		
Type / Size	a	Fr at 330 rpm
MSD12	38 mm	10500 N
MSD35	50 mm	21500 N
MSD60	83 mm	50000 N

For special design those data are subject to change. Always refer to specific application data.

4.2 "B" output shaft interface (with plain shaft)

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . B . S2

	Plain shaft external diameter
MSD12	28k6
MSD35	60k6
MSD60	65m6

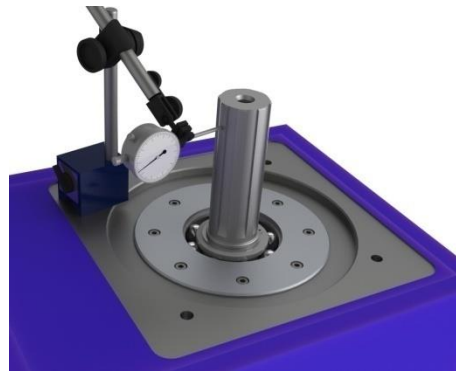
MSD gearbox can optionally be delivered with plain (or keyed) output shaft. Consult your nearest REDEX Agent for more details.

4.3 "C" output shaft interface (with slide dog free)

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . C . S2

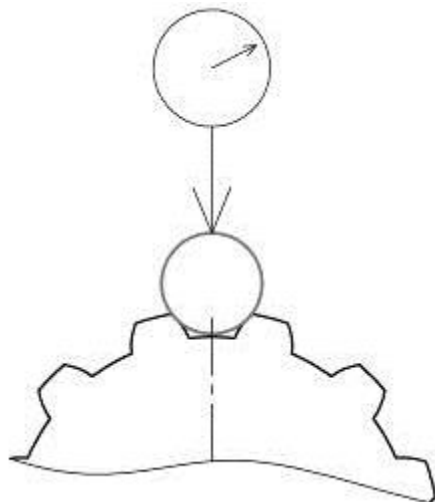
- A. Check the type of spline according the drawing of the MSD
- B. Put customer interface vertically
- C. Clean and degrease the customer output shaft, flange and pilot diameter
- D. The customer interface must respect concentricity value according the table; check the concentricity with a comparator

Shaft diameter d (mm)	Radial run-out (mm)
$18 \leq d < 30$	≤ 0.021
$30 \leq d < 50$	≤ 0.025
$50 \leq d < 80$	$\leq 0,030$

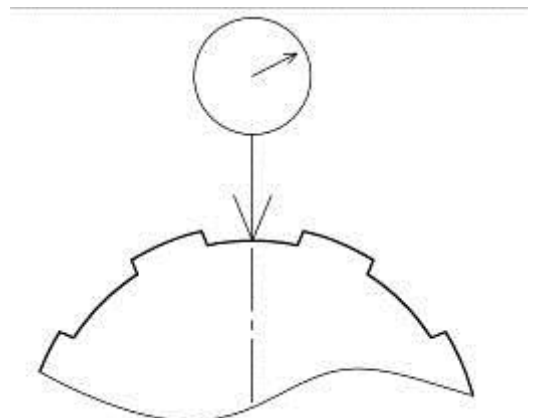


Shaft radial run-out measurement

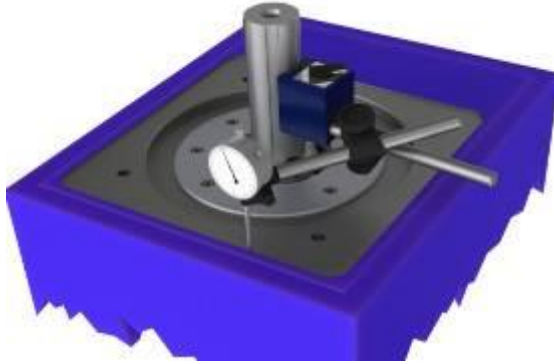
Involute spline checking
(according DIN 5480)



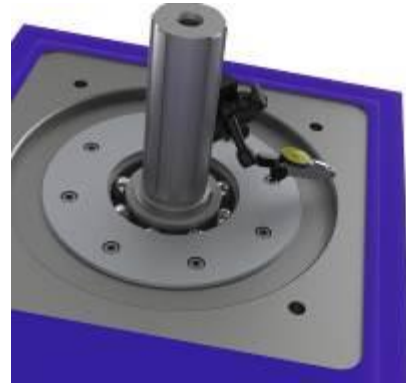
Parallel spline checking
(according NFE 22.131)



Pilot diameter b_1 (mm)	Max. axial face run-out	Pilot radial run-out (mm)
$100 \leq b_1 \leq 230$	$\leq 0,040$	$\leq 0,040$
$230 \leq b_1 \leq 450$	$\leq 0,050$	$\leq 0,050$
$450 \leq b_1 \leq 800$	$\leq 0,063$	$\leq 0,063$



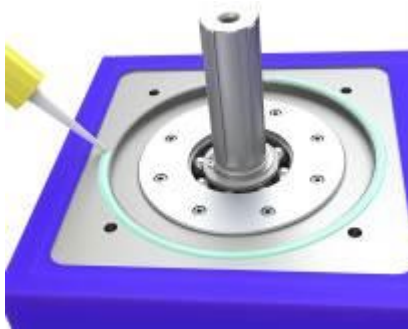
Face axial run-out measurement



Pilot radial run-out measurement

- E. The direct ratio 1/1 must be engaged.
- F. Insure the seal of the customer flange (Refer to the following pictures).

We recommend the following sealants:



Recommended sealants	
GEB	Gebsicone S Translucide
RUBSON	Mastique Silicone Incolore
LOCTITE	Silcomet INCOLORE

- P. Bring the MSD onto the customer interface (oscillate the customer shaft to find a proper teeth orientation for the introduction of the shaft into the slide-dog).
- Q. Fit the output MSD flange against the customer flange

WARNING!



Avoid teeth impact during this operation!

R. Tighten screws of the customer flange with the corresponding torque.

Screw type Class 12.9	Tightening torque (N.m)
M6	17
M8	41
M10	83
M12	145
M14	230
M16	355
M18	485
M20	690

5 SPEED CHANGE CONTROL

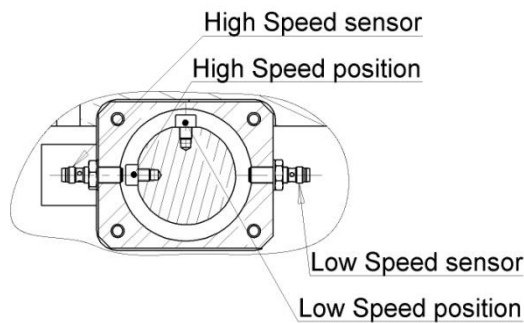
The gearbox is delivered with a two positions ratio change system installed. The slide dog positions are mechanically limited and electrically controlled. Ratio shift is obtained by reversing the motor polarity (see **Wiring diagram**).

5.1 Exact values of reduction ratio

Catalogue values	Size	Exact values
4.9	MSD35	5460 / 1104
	MSD60	6111 / 1242
3.8	MSD35	4753 / 1242

5.2 Ratio change by motoreducer

The indexed position is maintained by the motoreducer irreversibility (worm-gear type). After the position switch gives a signal that the ratio change is done, the power supply of the motor must be cut.



The speed change motoreducer moves the cam in front of proximity switches (hall-effect) when the gear is properly engaged. Their positions are set in our shop and must not be modified.

WARNING!

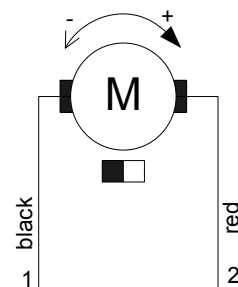


Any modification of the switches setting will modify the meshing of the gears and might damage the gearing.

5.2.1 Motor type

Motoreducer reference: **DOGA 316**
Connector **NEUTRIK NC3MXX-BAG**
Wire length: 8cm

Wiring:



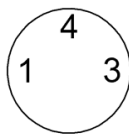
Power (W)	Voltage (V)	Nominal Current (A)	Starting Current (A)
	24	1,7	6

5.2.2 Position Switch type

Switch reference: BALLUFF: **BES M08EC-PSC15B-S49G**
Connector **S49** (M8)

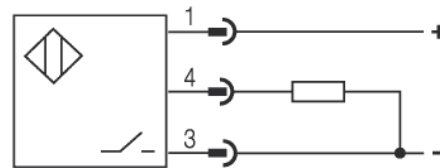
Voltage (V)	Switching Current (A)
24	0.2

Connector pinout:



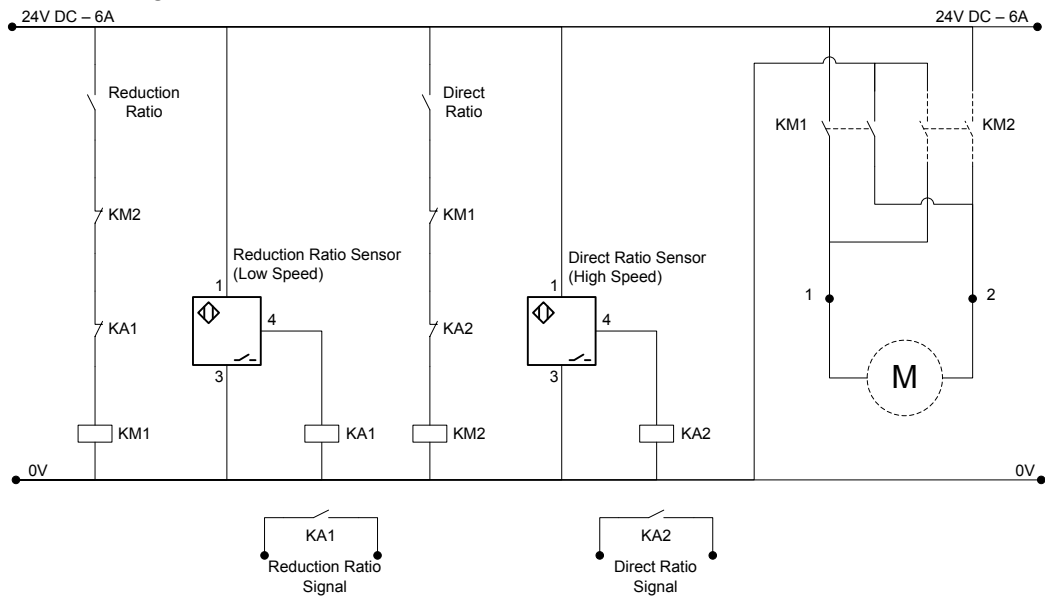
1 : brown
4 : black
3 : blue

Wiring:

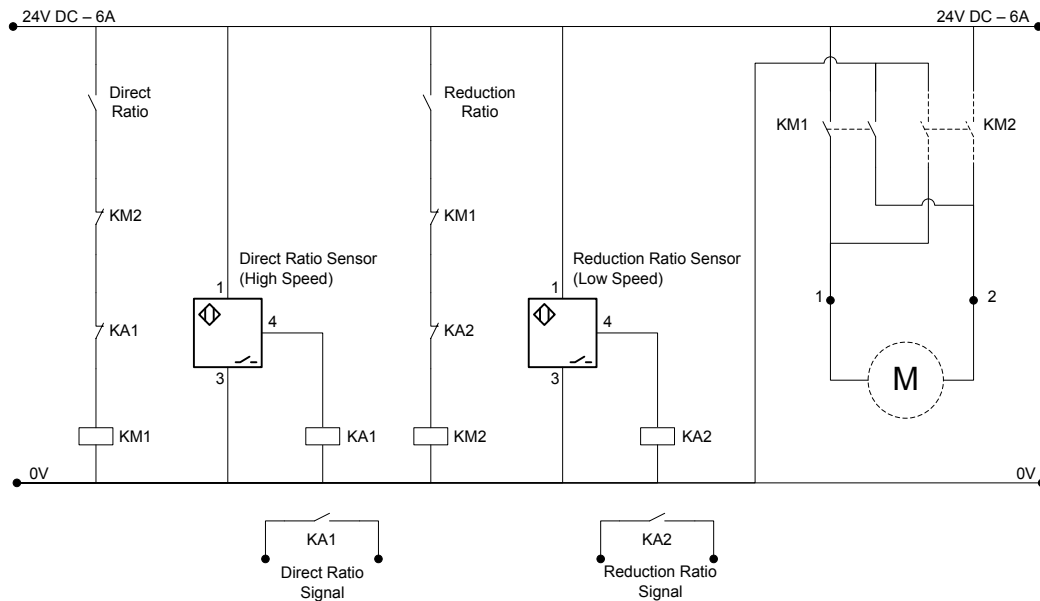


5.2.3 Electric diagram

5.2.3.1 Specific diagram for MSD12

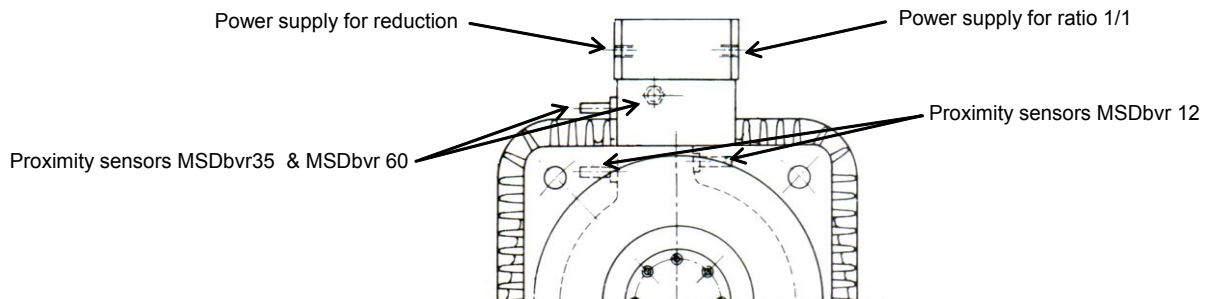


5.2.3.2 Specific diagram for MSD35 and MSD60



5.3 Ratio change by pneumatic / hydraulic actuator (2 positions)

Ratio change is done by reversing the supply circuit. The pneumatic or hydraulic actuator interface is 1/8" GAZ. Operating pressure range is from 5 to 10 bars.



WARNING!



The gear shift actuator pressure has to be maintained while running the MSD gearbox to insure that the gear remains engaged.

5.4 Ratio change by pneumatic / hydraulic actuator (3 positions)

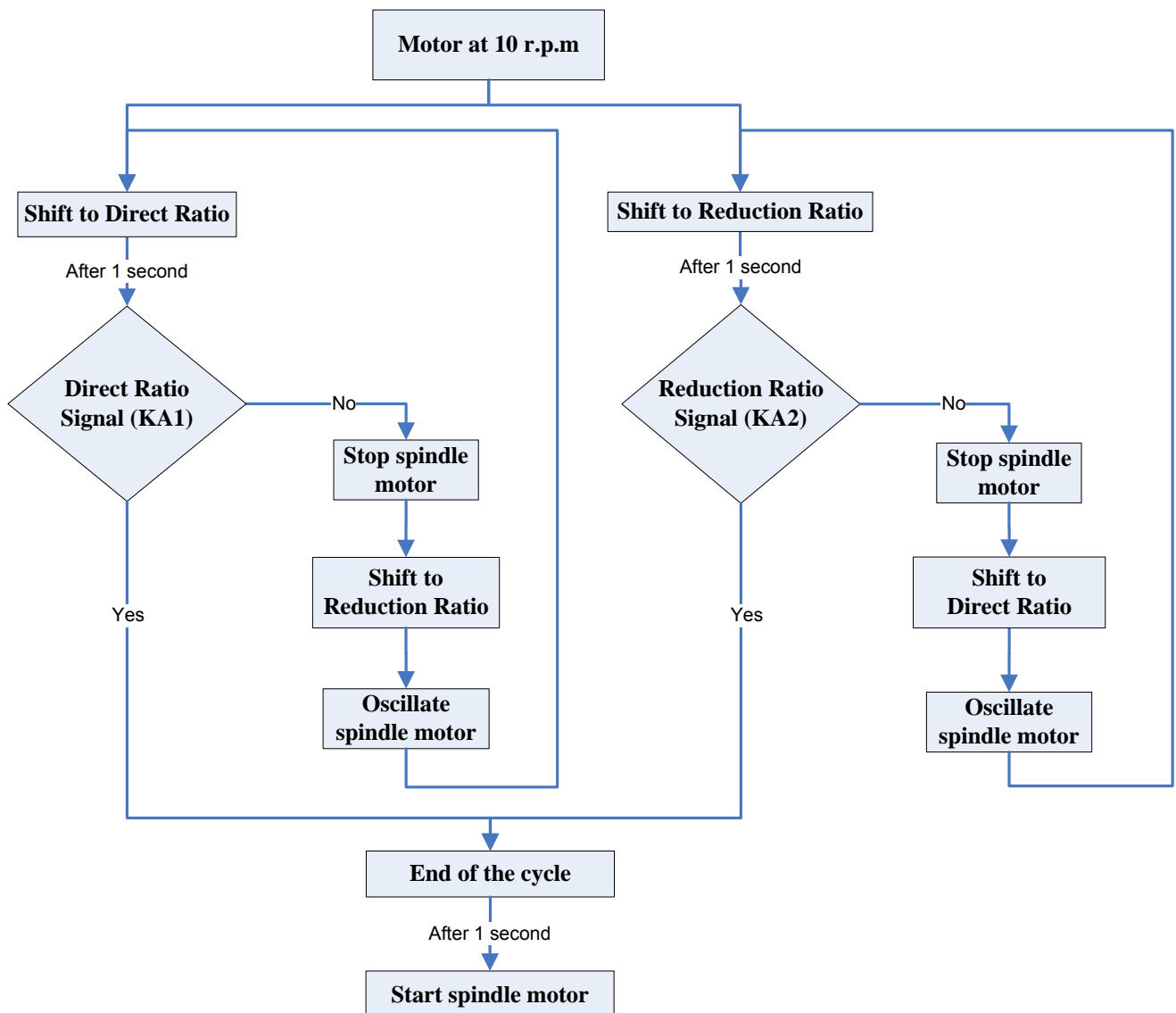
Specific 3 positions ratio change actuators are able to include a **neutral position**, please ask your nearest REDEX agent for specific instructions.

5.5 Gear shifting procedure



WARNING!

The gear change should be done at low rotational speed (< 10 rpm) and without load. Oscillating the spindle motor with 2 reversals of +/-10 degrees per second will insure good shifting (see diagram). Redex will not be responsible for any damage caused by a wrong speed change procedure.



WARNING!

Never increase the speed of main motor, if the position of the slide dog is not detected by one of the two proximity switches.

6 LUBRICATION

6.1 Generalities

The MSD gearboxes are supplied without oil. We advise a mineral oil having a viscosity of 22 to 100 Cst at 40°C. The first oil change should take place after 200 hours of running. Thereafter the oil should be changed every 3000 hours and the oil quantity checked at least every month.

6.2 Type of lubricant

Different type of lubrication is possible, it depends of the regulation temperature.

Type I - Splash or closed loop lubrication					
Without cooling system Without temperature regulation Viscosity 100 cSt at 40°C					
TOTAL	CASTROL	SHELL	MOBIL	ESSO	LUBCON
Total carter EP100 mineral	Castrol alpha SP100 mineral	Shell omala 100 mineral	Mobil gear627 mineral	Esso spartan EP100 mineral	Turmogearoil 100 synthetique
Type II - Open loop lubrication (with tank)					
With or Without cooling system Without temperature regulation Viscosity 68 cSt at 40°C					
TOTAL	CASTROL	SHELL	MOBIL	ESSO	LUBCON
Total carter EP68 mineral	Castrol alpha SP68 mineral	Shell omala 68 mineral	Mobil gear626 mineral	Esso spartan EP68 mineral	Turmogearoil 68 synthetique
Type III - Closed loop lubrication(without tank) or Open loop lubrication (with tank)					
With cooling system With temperature regulation Viscosity 22 to 32 cSt at 40°C					
TOTAL	CASTROL	SHELL	ESSO	LUBCON	
Azolla ZS22 ou ZS32 mineral	Castrol alphasyn T32 synthetique	Shell Tellus 22 ou 32 mineral	Esso Nuto H22 ou 32 mineral	Turmogearoil 22 synthetique	
Equivis ZS22 ou 32 mineral					

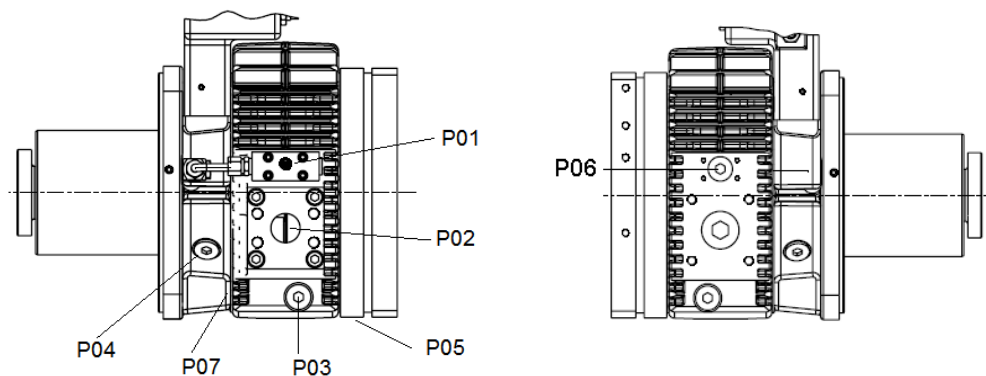


WARNING!

The drained oil is a special industrial waste and should be handled according to the current laws.

6.3 Oil plugs and connections

The MSD gearboxes have several holes and plugs dedicated to the lubrication. The next pages define the different lubrication configurations and all refer to this chapter.



	P01	P02	P03	P04	P05	P06	P07
MSD12	M12x100	M16x150	M12x100	1/4"GAZ	1/4"GAZ	-	M6x100
MSD35	1/4" GAZ	1" GAZ	1/2"GAZ	1/2"GAZ	-	1/2"GAZ	M10x150
MSD60	1/2"GAZ	Ø42 mm	1/2"GAZ	-	-	-	-

6.4 Lubrication for Horizontal running

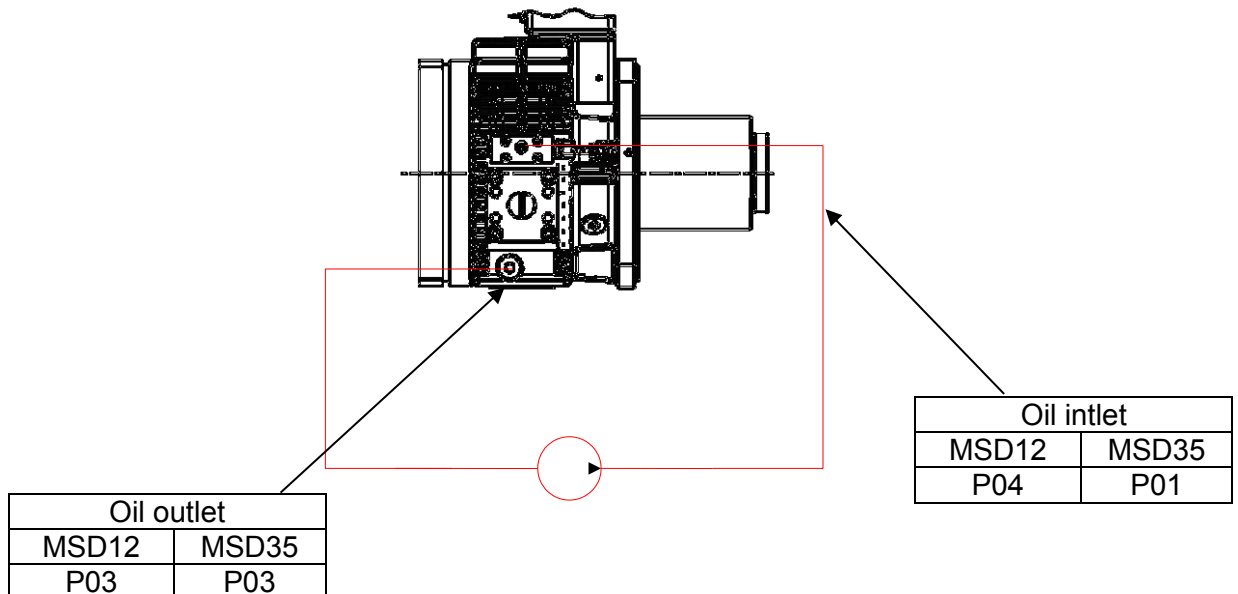
Please consult your REDEX nearest agent to determinate the lubrication and cooling requirement corresponding to your application.

6.4.1 Lubrication type I

Splash lubrication or Closed loop lubrication / Without cooling system / Without temperature regulation

The following table shows the max motor power for oil splash lubrication. It corresponds to an increase of the oil temperature of 50°C over the ambient.

For information, it is possible to run the gearbox without problems with oil temperatures up to 90°C.



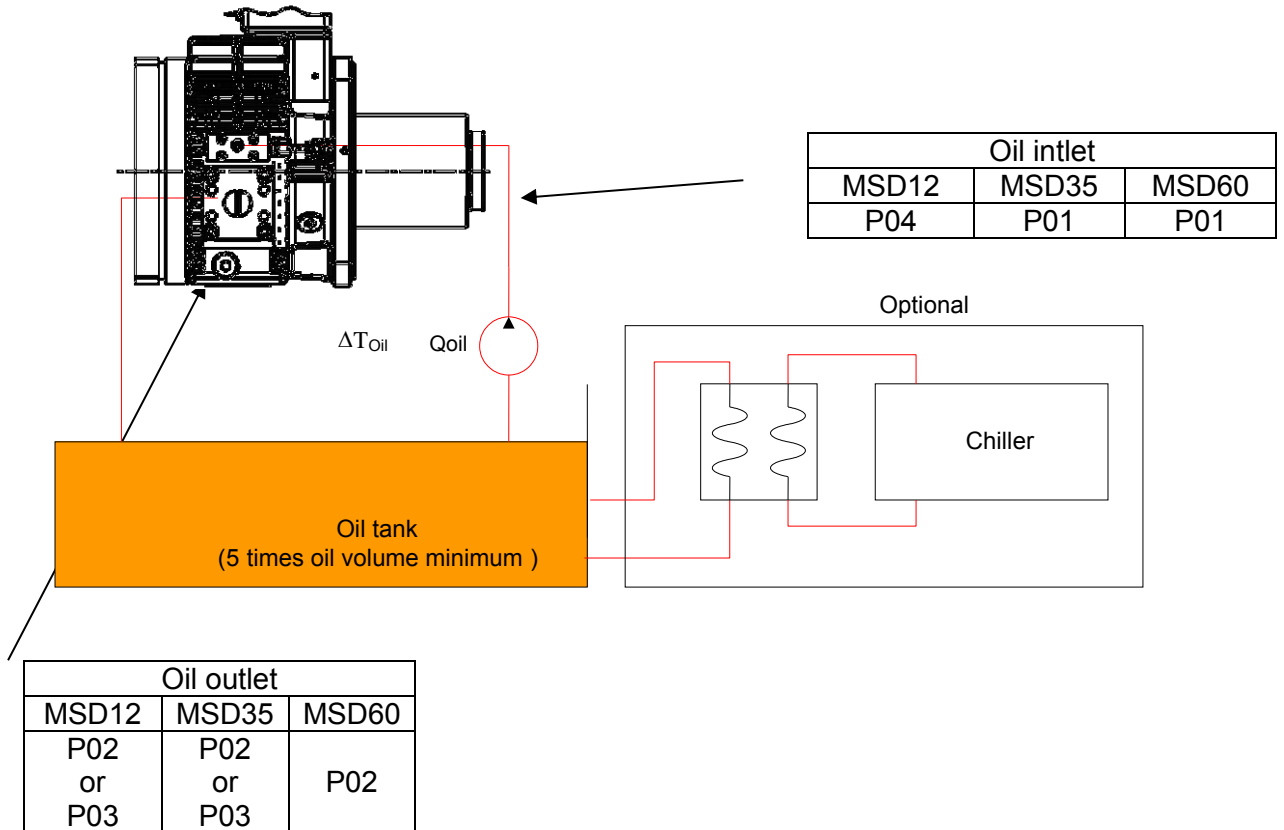
	Max motor power (S1-100%)	Lubrication type	Oil fill or inlet	Oil outlet	Oil level	Oil draining	Approximate quantity of oil inside the Gearbox (L)	Maximum oil flow rate (L/min)
MSD12	12 kW	Splash	P01	--	P02	P03	1	--
		Close loop	P04	P03				0,5 L/min
MSD35	35 kW	Splash	P06	--	P02	P03	2.25	--
		Close loop	P01	P03				4 L/min
MSD60	External lubrication with cooling system compulsory							

6.4.2 Lubrication type II

Open loop lubrication (with tank) / With or without cooling system / Without temperature regulation.

This configuration enable a easiest cooling system. Most often the oil into the tank has not to be refrigerated. The thermal inertia of the large oil volume contained into the tank might be large enough to save a cooling system.

For this configuration there is no standard accessory supplied by REDEX.



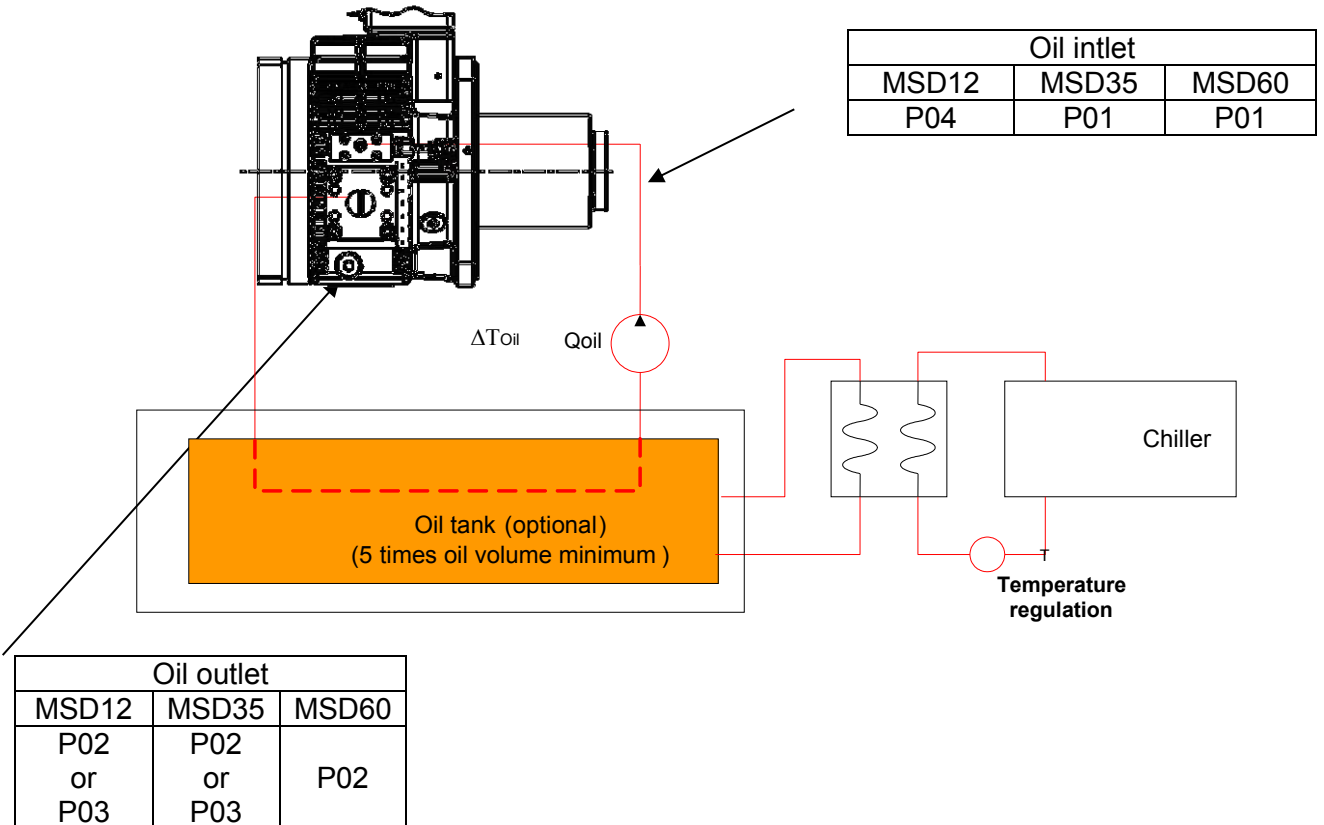
	Max application power ($\Delta T_{Oil} = 10^{\circ}C$)	Oil inlet	Oil outlet	Oil level	Oil draining	Approximate quantity of oil inside the Gearbox (L)	Maximum oil flow rate (L/min)
MSD12	12 kW	P04	P02	P02	P03	1	1 L/min
MSD35	52 kW	P01	P02	P02	P03	2.25	4 L/min
MSD60	89 kW	P01	P02	P02	P03	2.3	7 L/min

6.4.3 Lubrication type III

Closed loop lubrication (without tank) or open loop lubrication (with tank) / With cooling system / With temperature regulation.

When the motor power is higher than the thermal capacity of the gearbox it is necessary to cool the oil to keep the gearbox temperature increase under 50°C.

For this configuration there is no standard accessory supplied by REDEX.



	Lubrication type	Oil inlet	Oil outlet	Oil level	Oil draining	Approximate quantity of oil inside the Gearbox (L)	Maximum oil flow rate (L/min)
MSD12	open loop	P04	P02	P02	P03	1	1
	close loop		P03				
MSD35	open loop	P01	P02	P02	P03	2.25	4
	close loop		P03				
MSD60	open loop	P01	P02	P02	P03	2.3	7

Notes:

- (1) The oil flow rates depend on the oil ΔT , the power to be evacuated and the final housing temperature desired for the gearbox.
Therefore it may vary a lot depending on your application specification. **Please always refer to the application technical specification indicated by REDEX.**
- (2) ΔT = Output oil temperature – Input oil temperature

6.5 Lubrication for Vertical running

6.5.1 Vertical motor up

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . **A** . S2

Output shaft interface, code A, B or C

Output shaft interface	A	B	C
Chapter reference	6.5.1.1	6.5.1.1	6.5.1.2

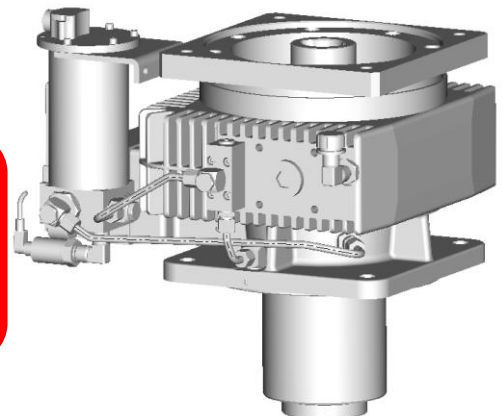
6.5.1.1 "A" or "B" output shaft interface

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . **A/B** . P2

WARNING!



MSD in vertical position requires an external pump to bring oil to the upper part of the gearbox.



External forced lubrication

For this configuration the MSD can be delivered with or without optional lubrication unit, this lubrication unit consisting of:

- a pump with an oil filter (see characteristics in the following table),
- a pressure sensor rated at 0,4 bar which makes contact on reducing pressure: 9.6-32 V DC, 0.5 A max. The sensor insures that the lubrication of the gearbox is done properly. If the pressure drops for longer than 20 seconds, it automatically stops the MSD operation.

	Oil inlet	Oil outlet	Oil level	Breather	Maximum oil flow rate (L/min)	Ext. Lubrication unit reference	Oil flow (L/min)	Power (W)	Voltage (V)	Filtering (µm)	Approximate quantity of oil inside the Gearbox (L)
MSD12	P05	P04	P07	P03	1	EX101146-00	1	40	220/380 50 Hz	100	1
MSD35	P01	P04	P07	P03	4	EX103560-00	2	100	220/380 50 Hz 265/460 60 Hz	100	1.8
MSD60	P01	P02	P02	P03	7	No standard supply by REDEX-ANDANDEX					

WARNING!



The pump must be running before starting the main-motor.

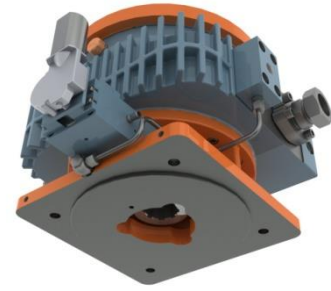
6.5.1.2 "C" output shaft interface

MSDXXX . A H 2 G . 3,8 M2 . 21J42 . C . S2

WARNING!



MSD in vertical position requires an external pump to bring oil to the upper part of the gearbox.

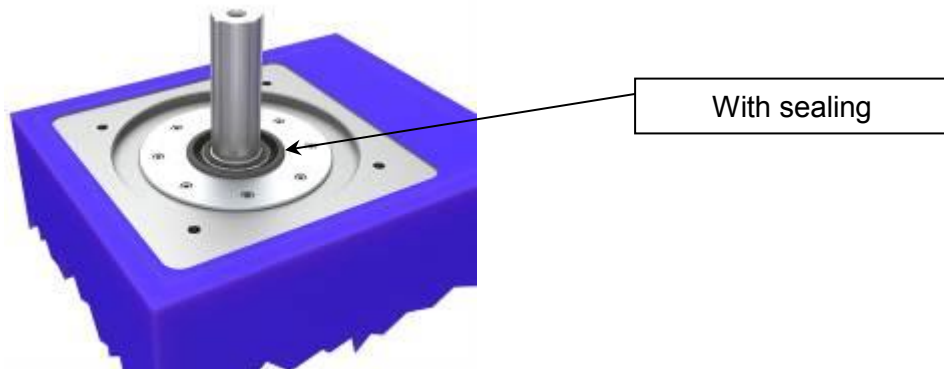


External forced lubrication

For this configuration the MSD can be delivered with or without optional lubrication unit, this lubrication unit consisting of:

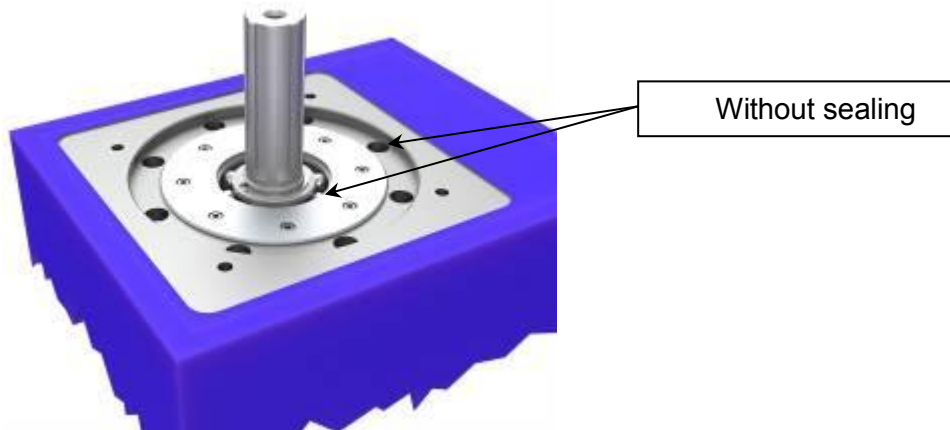
- a pump with an oil filter (see characteristics in the following table),
- a pressure sensor (IFM PK7524) rated at 0,4 bar which makes contact on reducing pressure: 9.6-32 V DC, 0.5 A max. The sensor insures that the lubrication of the gearbox is done properly. If the pressure drops for longer than 20 seconds, it automatically stops the MSD operation (see chapter 8 to set it).

Customer interface with sealing (MSD in splash lubrication)



	Oil inlet	Oil outlet	Oil level	Breather	Maximum oil flow rate (L/min)	Ext. Lubrication unit reference	Oil flow (L/min)	Power (W)	Voltage (V)	Filtering (µm)
MSD12	P05	P04	P07	P03	1	EX101146-00	1	40	220/380 50 Hz	100
MSD35	P01	P04	P07	P03	4	EX103560-00	2	100	220/380 50 Hz 265/460 60 Hz	100
MSD60	P01	P02	P02	P03	7	No standard supply by REDEX-ANDANDEX				

Customer interface without sealing



	Oil inlet	Oil outlet	Oil level	Breather	Maximum oil flow rate (L/min)	Ext. Lubrication unit reference	Oil flow (L/min)	Power (W)	Voltage (V)	Filtering (µm)
MSD12	P05	*	*	P03	1	EX101146-00	1	40	220/380 50 Hz	100
MSD35	P01	*	*	P03	4	EX103560-00	2	100 W	220/380 50 Hz 265/460 60 Hz	100
MSD60	P01	*	*	P03	7	No standard supply by REDEX-ANDANDEX				


* on the customer interface

WARNING!

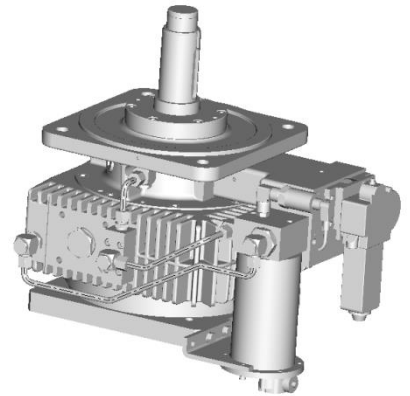
The pump must be running before starting the main-motor.

6.5.2 Vertical motor down

WARNING!



MSD in vertical position requires an external pump to bring oil to the upper part of the gearbox.



External forced lubrication


For this configuration the MSD can be delivered with or without optional lubrication unit, this lubrication unit consisting of:

- a pump with an oil filter (see characteristics in the following table),
- a pressure sensor (IFM PK7524) rated at 0,4 bar which makes contact on reducing pressure: 9.6-32 V DC, 0.5 A max. The sensor insures that the lubrication of the gearbox is done properly. If the pressure drops for longer than 20 seconds, it automatically stops the MSD operation (see chapter 8 to set it).

	Oil inlet	Oil outlet	Oil level	Maximum oil flow rate (L/min)	Ext. Lubrication unit reference	Oil flow (L/min)	Power (W)	Voltage (V)	Filtering (µm)	Approximatly oil quantity (L) *
MSD12	P04	P05	P02	1	EX101146-00	1	40	220/380 50 Hz	100	1.8 to 3
MSD35	P01	P03	P02	4	EX103560-00	2	100	220/380 50 Hz 265/460 60 Hz	100	1.8 to 3
MSD60	P01	P02	P02	7	No standard supply by REDEX-ANDANDEX					

* Depending of the motor

WARNING!



The pump must be running before starting the main-motor.

7 TROUBLE SHOOTING / FAQ

If the information provided into the following table is unable to solve the problem, please consult your nearest REDEX agent.

Trouble observed	Potential cause	Measure to solve it
Proximity sensor does not detect gear engagement	Proximity detector(s) is damaged	Replace proximity detector(s)
No gear change happen	Change speed actuator is damaged	Replace the change speed actuator
	Elastic coupling between motoreducer and actuator axis is damaged	Replace the coupling
	Wrong power supply to the actuator	<u>Electrical speed changer</u> : check the connection <u>Pneumatic actuator</u> : check the pressure and the leak tightness of the circuit.
	Mechanical problem	Send the gearbox back to REDEX for analyze and eventual repair
Gearbox is noisy (knocking noises)	Speed encoder on motor is not working properly	Check speed encoder connections and clean it if necessary.
In vertical mounting & closed loop external forced lubrication <u>the oil flow sensor forces the machine to stop</u>	Some air is sucked with the oil and the pump is surging (the pressure sensor detect irregular pressure drops)	Check the leak tightness of the connections between pipes, gearbox & pump. Check that the hexagonal screw on the side of the filter is properly tightened
	Pump is damaged	Test the pump alone to check if it is out of order and replace it if necessary

8 ANNEXES

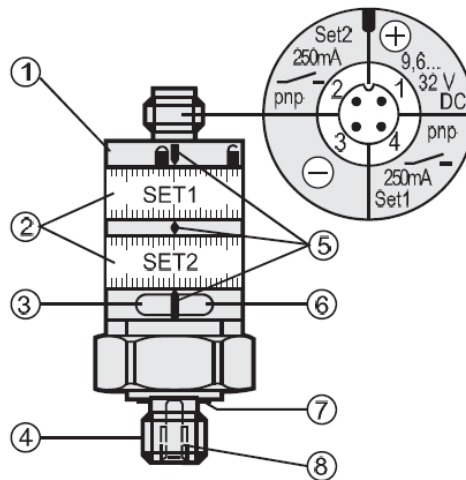
8.1 Pressure monitor

8.1.1 Generality

The pressure monitor detects the system pressure and generates two output signals

- In case of increasing pressure, OUT1 or OUT2 closes when SET 1 or SET 2 value is reached.
- In case of decreasing pressure, OUT1 or OUT2 opens when SET 1 or SET 2 value is reached.

8.1.2 Setting



Pin 4=OUT1 / Pin 2=OUT2

1: locking ring

2: setting rings (manually adjustable after unlocking)

3: yellow LED: Set1 value reached, OUT1 = ON

4: process connection G¹/₄ A; tightening torque 25 Nm

5: setting marks

6: yellow LED: Set2 value reached, OUT2 = ON

7: sealing FPM/ DIN 3869-14

8: internal thread M5

To set the pressure sensor (IFM PK7524) at 0,4bar on the OUT1:

- Turn the ring 1 on unlock position
- Turn the setting ring 1 on 0.4bar
- Turn the ring 1 on lock position

GUARANTEE CARD

As far as they are delivered as new, REDEX units have 2 years guarantee, starting from the shipping date. When the units are repaired in REDEX workshops, the guarantee period is 6 months.

The guarantee is limited to the free replacement of defective parts and is only applicable if the following conditions are observed:

1. The unit has not been disassembled.
2. The selection of the unit was made in full accordance to the REDEX technical documentation.
3. The mounting and interfacing with the machine were properly carried out.
4. Maintenance periodicity, oil quality and quantity have been respected.
5. The average output power was less than the maximum acceptable power as shown in the technical documentation.
6. Operations must be performed in our workshops and the shipment costs will be charged to the customer.

FICHE DE GARANTIE

Lorsqu'il est livré neuf, le matériel REDEX est garanti pour une durée de 2 ans, à partir de la date d'expédition. Lorsqu'il s'agit d'un appareil réparé dans nos ateliers, la durée de garantie est de 6 mois.

L'étendue de cette garantie s'applique au remplacement gratuit des pièces reconnues défectueuses, sous réserve que les conditions suivantes soient respectées :

1. Le matériel n'a pas été démonté hors de nos ateliers.
2. Le choix du matériel a été effectué conformément aux indications de nos documentations techniques.
3. Le montage du matériel et les interfaces avec les éléments de machines ont été effectués en suivant les procédures de ce manuel.
4. La périodicité de graissage, la qualité et la quantité d'huile préconisées ont été respectées.
5. La puissance moyenne en sortie est inférieure à la valeur maximum indiquée sur la documentation technique du produit.
6. La remise en état est obligatoirement réalisée dans les ateliers de REDEX, et les frais de port restent à la charge du client.

GARANTIE BEDINGUNGEN

REDEX Neugetriebe haben 2 Jahre Garantie nach Versand. Bei Reparaturen aus unseren Werkstätten, beträgt die Garantiedauer 6 Monate.

Die Garantie ist auf den kostenfreien Austausch der defekten Teile begrenzt und ist nur gültig, wenn folgende Bedingungen beachtet wurden:

1. Das Getriebe wurde nicht geöffnet.
2. Die Auswahl und der Einsatz des Getriebes erfolgten in voller Übereinstimmung mit der technischen Dokumentation von REDEX.
3. Die Schnittstelle zur Maschine und die Montage wurden sauber ausgeführt.
4. Wartungsintervalle, Öl-Menge und -Qualität wurden durchgehend beachtet.
5. Die durchschnittliche Abtriebsleistung war weniger als die maximal erlaubte Leistung aus unserer technischen Dokumentation.
6. Arbeiten am Getriebe können nur in unserer Montage erfolgen und die Versandkosten werden dem Kunden berechnet.

HOJA DE GARANTIA

Las unidades REDEX suministradas como nuevas tienen un periodo de garantía de 2 años. Las unidades que hayan sido reparadas en REDEX tienen un periodo de garantía de 6 meses. Ambos periodos empezarán a ser efectivos desde la fecha de expedición.

Esta garantía está restringida exclusivamente al cambio de las piezas defectuosas de fabricación y es únicamente aplicable si se cumplen las siguientes condiciones:

1. La unidad no haya sido desmontada.
2. La selección de la unidad se haya llevado a cabo siguiendo de forma correcta las especificaciones técnicas contenidas en el catálogo o las realizadas por su agente REDEX.
3. El montaje y acoplamiento de la unidad se haya realizado siguiendo estrictamente las especificaciones de montaje contenidas en el manual de usuario.
4. La periodicidad de mantenimiento, referencia y cantidad de aceite de lubricación hayan sido respetadas.
5. La potencia media de salida sea menor que la máxima aceptable por la unidad, tal como muestra la documentación técnica.
6. Toda reparación o revisión interna de la unidad debe llevarse a cabo en nuestras instalaciones y los costes derivados del transporte correrán a cuenta del cliente.

GARANZIA

Le unità REDEX hanno 2 anni di garanzia dalla data di consegna. Quando le unità sono riparate in REDEX il periodo di garanzia è di 6 mesi dalla data di consegna.

Questa garanzia comprende la sostituzione gratuita dei pezzi riconosciuti difettosi. La garanzia è applicabile solo se le seguenti condizioni vengono rispettate :

1. Il cliente non ha smontato l'apparecchio
2. La scelta dell'apparecchio è stata effettuata in conformità alle indicazioni dei nostri documenti tecnici.
3. Il montaggio del nostro materiale e gli accoppiamenti con gli elementi della macchina sono stati effettuati a regola d'arte.
4. La periodicità della lubrificazione, la qualità e la quantità di olio sono state rispettate.
5. La potenza media oraria in uscita è inferiore al valore massimo indicato nelle documentazione tecnica del prodotto.
6. La revisione si effettua obbligatoriamente presso la REDEX e il trasporto di andata e ritorno è a carico del cliente.

质保卡

REDEX 齿轮箱产品从发货之日起，新齿轮箱具有2年质保期。当齿轮箱在 REDEX 工厂维修之后，质保期为6个月。

1. 质保只限于免费更换故障部件，并只适用于以下情况：
2. 齿轮箱未被自行拆开。
3. 客户所选齿轮箱是完全按照 REDEX 技术文档选型的。
4. 在设备上的安装和连接方法是正确的。
5. 维护周期、润滑油质量和数量均遵照说明书要求。
6. 平均输出功率低于技术文档中的最大可输入功率。
7. 维修必须在我们的工厂进行，运输费用由客户承担。

Unit serial number - Numéro de série de l'appareil - Seriennummer des Getriebes –
Numero di matricola - Número de serie - 减速器序列号

Code - Code – Bezeichnung - Codice – Código - 代码

Designation - Désignation – Bezeichnung - Designazione – Designación - 名称

Despatching date - Date de sortie - Versanddatum - Data di uscita - Fecha de
expedición - 出厂日期

Workshop manager signature – Signature du responsable du montage - Unterschrift
Leiter Technische Dienste - Firma del responsabile di officina - Firma del responsable
de fábrica - 车间经理签名

REDEX

REDEX subsidiaries and sales offices

France

REDEX S. A.
ZI – BP 79
45210 Ferrières
Tel. +33 02 38 94 42 00
Fax +33 02 38 94 42 99
Web : www.machine-drives.com
E-mail : info@redex-group.com

España

REDEX Spain, S.L
Avda. Cervantes 31
Edif. Metro Dpto. 2
E-48970 BASAURI
Tel. +34 944 404 295
Fax +34 944 495 165
Web: www.machine-drives.com
E-mail: redex-spain@redex-group.com

USA

ANDANTEX USA Inc.
1705 Valley Road
Wanamassa
Ph. +1 732 493 2812
Fax +1 732 493 2949
Web: www.andantex.com
E-mail: info@andantex.com

China

REDEX (Shanghai) Mechanical Repair Services Co., Ltc
Block 12, No 388 Sanbang Road
Songjiang District
201 611 Shanghai
P.R.C
瑞德克斯(上海)机械维修服务有限公司
中国上海市松江区三浜路388号12栋
Tel. / 电话 : +86 21 6448 0636
Fax / 传真 : +86 21 6448 0757
Website / 网址 : www.redex-china.cn
Email : sales@redex-china.cn

United-Kingdom

ANDANTEX Ltd
Rowley Drive
Coventry CV3 4LS
Tel. +44 24 7630 7722
Fx +44 24 7630 4499
Web: www.machine-drives.com
E-mail: sales@andantex.co.uk

Italia

ANDANTEX Srl
Via A. Ponchielli, 6
20063 Cernusco sul Naviglio (MI)
Tel. +39 02 92 17 091
Fx +39 02 92 100 455
Web: www.machine-drives.com
E-mail: sales@andantex.it

Deutschland

REDEX GmbH
Schillerstraße 16
34431 Marsberg
Tel. +49 7251 36 67 935
Fax +49 7251 44 06 637
Web: www.machine-drives.com
E-mail: redex-gmbh@redex-group.com