

Red-D-Arc Weld Automation

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OPERATION MANUAL

CONVENTIONAL POSITIONER Model RDA AHVP100-6 NA (10,000 lb)



For use with products having Serial Number 06911 and following

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1.0 PREFACE

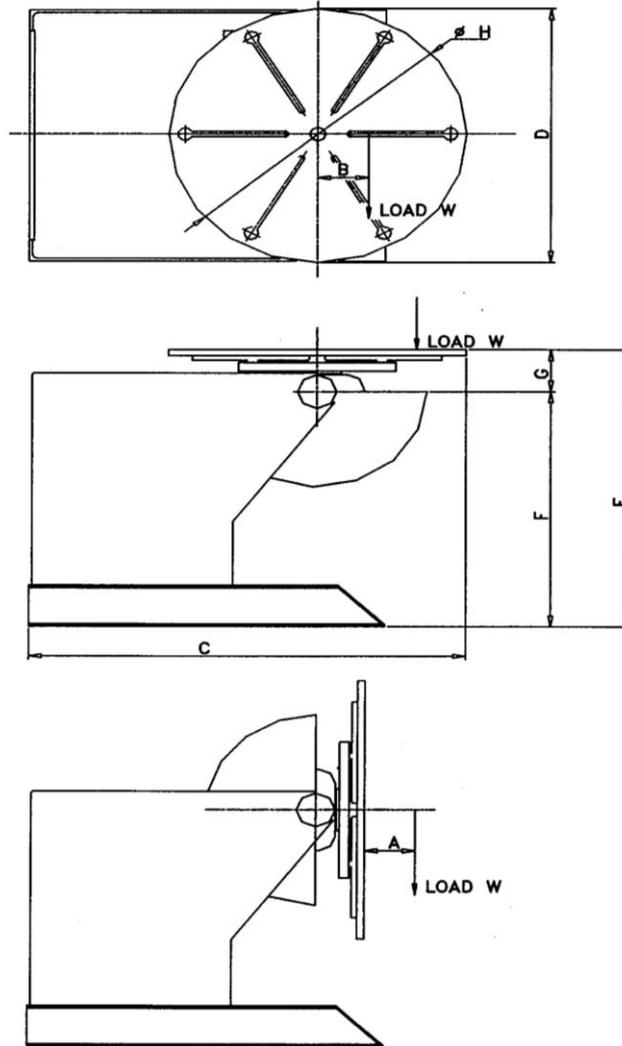
This user’s manual describes the everyday use and maintenance of our Welding Positioners. Any actions that are required to be carried out by the manufacturer have not been included in this manual.

This manual is part of the machine. Please keep this manual safe. Information in this manual could be useful at a later time or when a repair or maintenance is carried out. We suggest that a copy of the manual is made and kept with the machine; the original should be kept in a safe place. If necessary, replacement copies can be supplied. If the machine is sold at a later date then the manual should be also supplied with it to the new user.

1.1 MACHINE SPECIFICATIONS

1.2 LOADING DATA

CONVENTIONAL POSITIONERS LOADING DATA

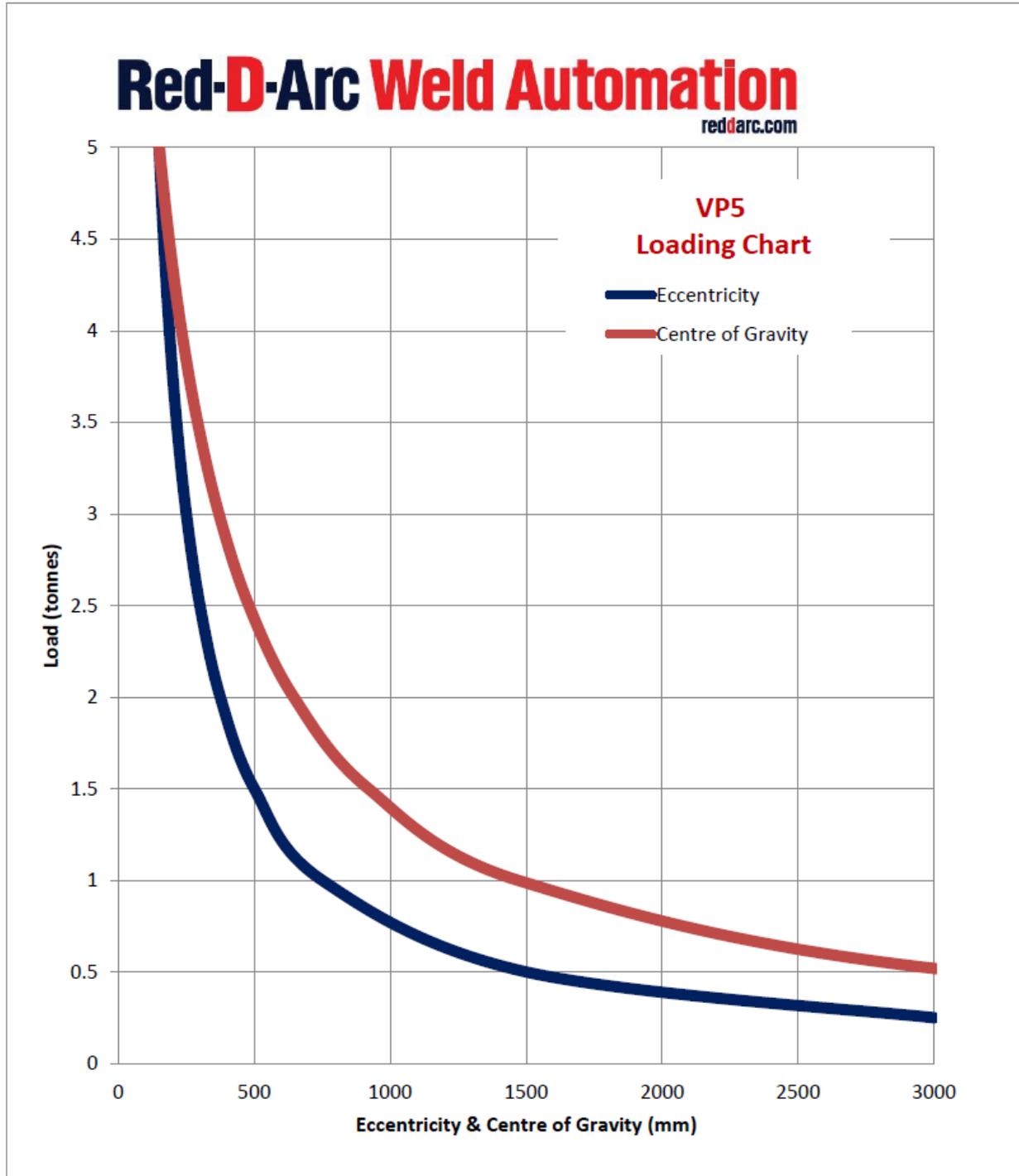


ROTATION TORQUE (R) IS A STRAIGHT FORWARD CALCULATION OF LOAD (W) X ECCENTRICITY (B) BUT TO ENSURE AN ACCURATE FIGURE FOR TILT TORQUE (T) IT IS IMPORTANT TO USE THE FULL DISTANCE TO THE PIVOT POINT. THIS IS OBTAINED BY ADDING TOGETHER THE CENTRE OF GRAVITY (A) AND TABLE PIVOT DISTANCE (G). THEREFORE :-
 ROTATION TORQUE (R) = W X B Kg METRES
 TILT TORQUE (T) = W X (A + G) Kg METRES
 MULTIPLY BY 9.81.

Figure 1 Loading Calculation Diagram

1.3 LOADING CHART

Figure 2 Loading Chart



1.4 SPECIFICATION

Load capacity	:	5000kgs @ 150mm ecc & 150mm c.o.g.
Table diameter	:	1400mm
Degree of table tilting	:	135°
Degree of table rotation	:	360°
Table rotation speed	:	0.07 – 1 RPM
Table tilting speed	:	60 seconds through 135°

Height Settings when table horizontal

Position 1	:	1200mm
Position 2	:	1500mm
Position 3	:	1800mm

Table equipped with efficient built in earthing, 300 amps, and mounted on pre-loaded crossroll bearing.

Table rotation fitted with AC motor and controlled by an Inverter unit suitable for 380 to 480V, 3 Phase supply.

Tilting through AC electric motor equipped with limit switches to prevent over-run.

Table can be manually elevated from the base, and locked into position using one of the three pin locations.

The main control panel mounted on the machine containing the following, mains isolator, mains on lamp, emergency stop button and reset button.

The positioner is also supplied with a low voltage remote pendant control containing forward/stop/reverse, tilt-up/tilt-down pushbuttons and a variable speed potentiometer connected with 6 meters of cable to the control panel.

Mains electrical supply suitable for 380-480 Volts, 3 phase, 50/60 Hz.

1.5 CE CERTIFICATE OF CONFORMITY**Machine Type** 5T Welding Positioner**Model** AHVP5

We hereby certify that the above machine has been manufactured by Key Plant Automation Limited, and conforms to the essential requirements of the following E. U. Directives;

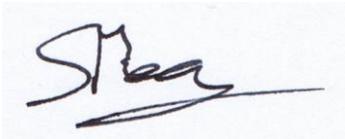
Supply of machinery (Safety) Regulations implementing the EC Machinery Directive 89/392/EEC amended 91/368/EEC and 93/44/EEC and 93/68/EEC codified to 98/37/EC.

73/23 EEC Low Voltage Directive amended by the directive 93/68 EEC regarding safety of electrical equipment.

89/336 EEC Electro-Magnetic Compatibility amended by directives 92/31 EEC and 93/68 EEC.

As implemented by the UK. Supply of Machinery (Safety) Regulations 1992.

Authorised signatory



Steve Piercy
Engineering Manager

1.6 UL/CAS LISTING INFORMATION



ONLINE CERTIFICATIONS DIRECTORY

GPNY.E353668 Factory Automation Equipment

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Factory Automation Equipment

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KEY PLANT AUTOMATION LTD

KENSINGTON HOUSE
7 ROE LANE
SOUTHPORT
MERSEYSIDE, PR9 9DT UNITED KINGDOM

E353668

Column and booms, Model MD AMxBM. Where A = 2, 3, or 4 and B = 2, 3, or 4.

Model HD AMxBM. Where A = 3, 4, 5, 6, 7 or 8 and B = 3, 4, 5, 6 or 7.

Positioners, Model VP X. Where X = 0.25, 0.75, 1.5, 3, 5, 10, 15, 20, 25 or 35.

Rotators, Model CR X. Where X = 10, 20, 30, 60, 100, 125, 200, 300, 400 or 500.

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Rotators, Model CR X. Where X = 10, 20, 30, 60, 100, 125, 200, 300, 400 or 500.

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2.0 INSTALLATION

Remove transport protection (if any) from the machine.

Locate the machine on a level floor that is capable of withstanding approximately 5 tonnes over the contact area.

Connect the electrical mains to the machine, 380-480 volts, 3 phase, 50/60Hz.

Connect the welding earth cable to the copper earthing strip that is located on the underside of the table, fixed to the crosshead. If this connection is NOT made the weld current will earth through the centre of the table assembly and damage the bearings and other transmission parts. *(see photo below for earthing connection bracket).*



Figure 3 Photo of Earthing Point

Before making the machine fully operational, remove any necessary covers and check that gearboxes have not lost any lubrication during transport.

3.0 OPERATION

3.1 Control Panel

The control panel on the drive unit has the following;

1. Power On Light – Illuminates when the power is connected.
2. Reset Button – for resetting the machine after an emergency stop has occurred. The button will be illuminated to show the rotator needs to be reset.
3. Footswitch Selector
4. Direction L/R Selector
5. Emergency Stop Button
6. Panel door opening key
7. Door electrical isolator, must be turned off before panel door can open.



Figure 4 Main Panel

3 Position Selector No 3 (On Photo)

Position FS I – Control by footswitch with Speed Controller

Position FS II – Control by footswitch without Speed Controller. Speed control is performed via the hand pendant control.

PEND – All controlled through the hand pendant.

2- Position Selector No. 4 (On Photo)

←/→ Rotation direction selector clockwise/anti-clockwise for use with footswitch.



3.2 Control Pendant Operation

It is imperative when loading the machine that the fabrication is held firmly on the table, using the table slots provided. It is also important that the machine is NOT OVERLOADED by placing on it fabrications which are heavy or are beyond the capacity of the machine in terms of Centre of Gravity or Eccentricity.

Once the machine has power connected and the “power on” light is illuminated. The machine will be ready to run. If the emergency stop button has been depressed then release this by twisting the cap, then press the emergency stop reset button on the control box.

Speed and movement of the positioner are controlled by the hand pendant, (see photo below).



Figure 5 Hand Control Pendant

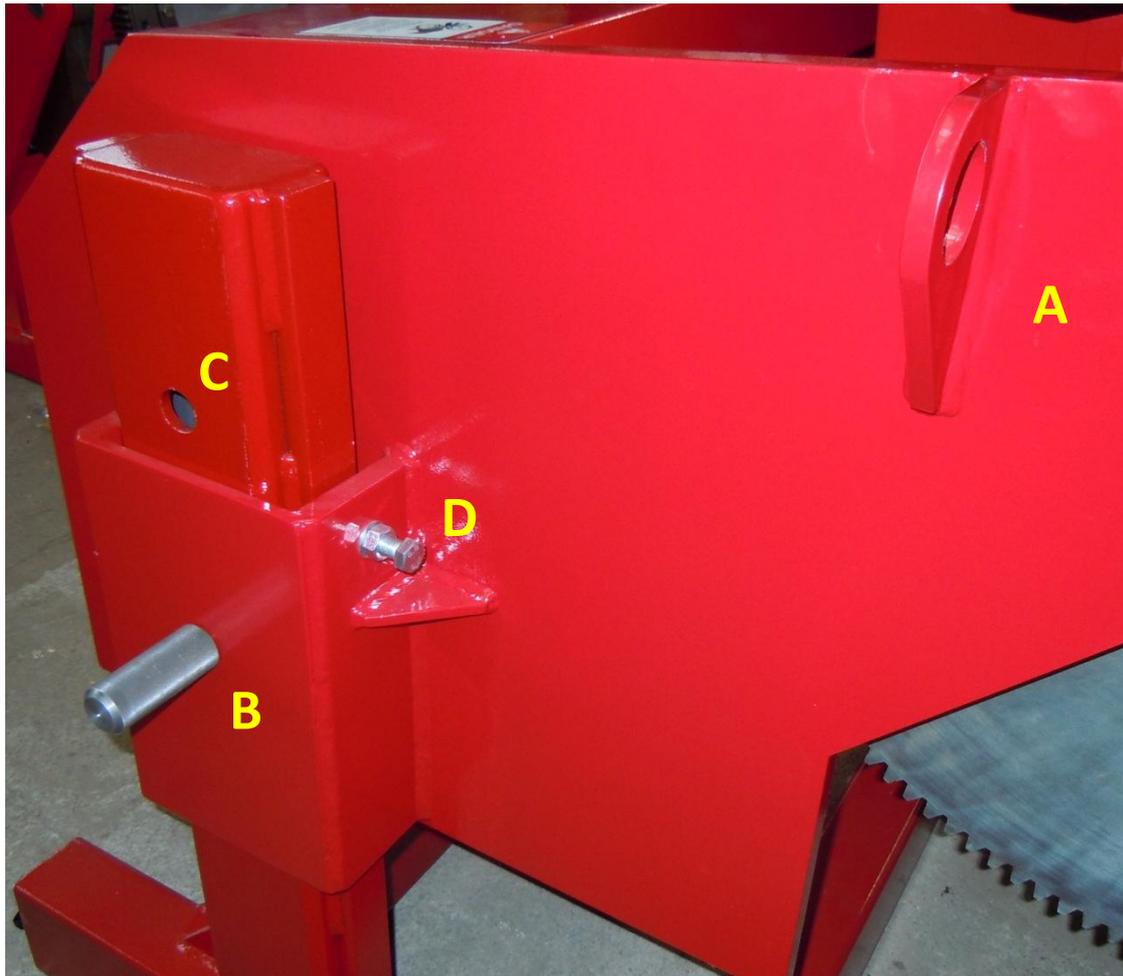
The buttons on the pendant operate as follows:

Button A	Hold to Run Push Button Tilt UP
Button B	Hold to Run Push Button Tilt Down
Button C	Table Rotation Reverse Direction Push
Button D	Table Rotation Stop Push Button
Button E	Table Rotation Forward Direction Push
Dial F	Rotation Speed Potentiometer
Button G	Emergency Stop Push Button

3.3 Adjusting Height Position

The positioner can be set at one of three height positions. To alert the height of the machine please follow this simple procedure.

First loosen off bolts D (2 on either side of the machine), this will release the table section so that it can be lifted. Then connect a crane to the lifting eyes on either side of the machine (A). Take up the slack on the lifting eyes so the weight is taken by the crane, then the lock pins (B) on either side of the positioner can be removed.



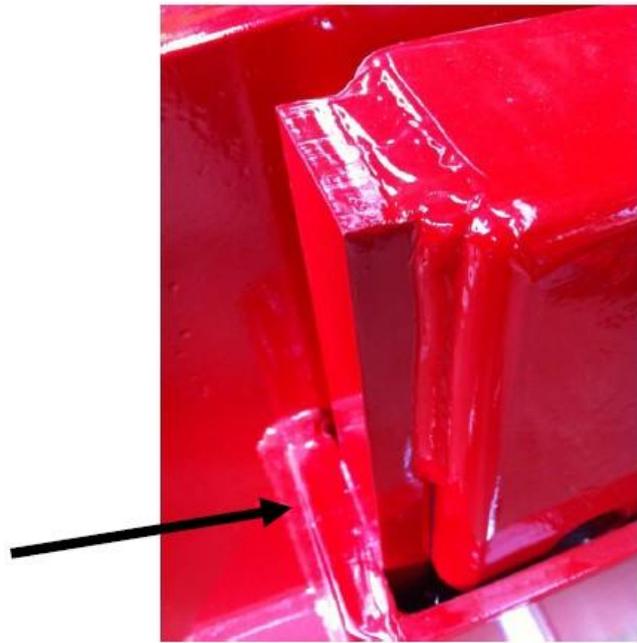
The table can then be raised or lowered by using the crane, so that hole C lines up with the lock pin (B) holes. Pin B on both sides of the machine can then be replaced. Once pins B are fully in place on both sides, then the weight of the table can be taken by the pins and the crane removed. Tighten the 4 bolts D (2 on either side of the machine); this will prevent any movement of the positioner inside the height adjustment sleeve.

Front Top



Front

Rear Top



Back

Note the vertical leg (with holes C through), is designed to sit flush, metal on metal at the top rear of the and bottom front of the sleeve (see pictures above). These areas are designed to take the weight of the machine. The bolts (D) are there to close the gap at the top front and bottom rear of the sleeve, so that there is no movement of the position in the sleeve.

4.0 MAINTENANCE

4.1 MAINTENANCE - TAPER ROLLER BEARINGS & LOCKNUTS

Self aligning roller bearings are present to give zero end float. In time due to wear and vibration they may slacken off. They should then re-tighten to regain zero end float. Adjustment is obtained by means of the two lock nuts.

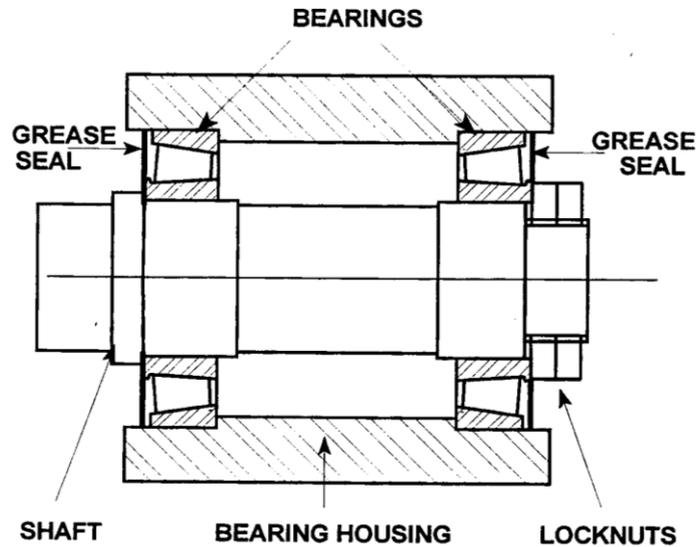


Figure 6 Roller Bearing

Replenish at 500 hour intervals with CASTROL SPHEEROL MP3. For high temperature conditions change grease to CASTROL SPHEEROL B3.

4.2 MAINTENANCE - PHOSPER BRONZE BEARINGS

Replenish at 500 hour intervals be means of grease nipples using CASTROL SPHEEROL MP3.

All of the phosphor bronze bushes used are retained with LOCTITE 601 bush retaining fluid. Any bush which becomes displaced should be carefully removed, thoroughly cleaned with the correct application of LOCTITE degreasing fluid and then coated with retaining fluid before being replaced.

4.3 MAINTENANCE - OPEN GEARS

All gears are liberally coated with grease, CASTROL MS3 [molybdenum disulphide]. At 500 hour intervals remove safety guards and check coating, and if required replenish grease.

4.4 MAINTENANCE - ROTATION WORMBOX

The worm box fitted on this machine is factory filled with a synthetic lubricant SHELL TIVELA SA and should not require any further maintenance during its lifetime.

It is important however to check at regular intervals that there are no leaks. If any leaks are observed, the unit must be drained, new seals fitted and re-filled with the correct amount of lubricant.

4.5 MAINTENANCE - TILT WORM BOX

The worm box fitted on this machine is factory filled with a synthetic lubricant SHELL TIVELA SA and should not require any further maintenance during its lifetime.

It is important however to check at regular intervals that there are no leaks. If any leaks are observed, the unit must be drained, new seals fitted and re-filled with the correct amount of lubricant.

4.6 MAINTENANCE - EARTHING BRUSHES

All rotary tables that are used for manipulating components to be welded are fitted with Earthing Brush's to carry welding current away from the machines rotating axis to a suitable pickup point.

IT IS MOST IMPORTANT TO CONNECT AN EARTHING CABLE TO THE MACHINES PICKUP POINT AND NOT TO EXCEED THE MAXIMUM RATING STATED. OTHERWISE SERIOUS DAMAGE CAN OCCUR TO MACHINES ROTATING AND ELECTRICAL PARTS.

4.7 MAINTENANCE - ELECTRICAL MAINTENANCE

It is the responsibility of the user to ensure only competent personnel deal with the operation and maintenance of the equipment.

Operators should be conversant with the equipment and be able to recognise the symptoms maloperation and/or degraded performance. They should also be aware of what action to take in the event of a fault/emergency.

It is recommended that maintenance personnel have adequate training on the system and also the component parts. They should have a thorough knowledge of diagnosis and fault finding techniques and be conversant with identifying the first signs of maloperation.

During maintenance/fault finding etc, the following points should be observed

The equipment should be completely isolated whenever possible. If an element of live diagnosis is required the use of barriers/warning notices is a must.

The maintenance staff should be familiar with the appropriate factory and safety regulations that apply in the province and country that they are employed in, and work on the equipment in such a manner as to comply with them.

The period between specific maintenance tasks will vary dependant on such factors as type of equipment and environment of the equipment. These factors should be assessed by the respective maintenance staff and maintenance periods adjusted accordingly.

Maintenance should include attention to the points listed below:

4.8 MAINTENANCE - CLEANLINESS / ENVIRONMENT

It is essential that the cubicle interior remains clean and dry. Any ingress of moisture or dirt should be cleaned with a lint free cloth or suitable suction device. Fans and filters should be checked regularly for blockages and dirty filter mats should be replaced with the correct grade of mat.

4.9 MAINTENANCE - TIGHTNESS OF CONNECTIONS

It will be necessary to periodically check the tightness of terminals and busbar connections including earth connections, especially in areas where vibration is apparent. Check for any hot spots developing during running.

Checks should be performed with the power supply isolated.

4.10 MAINTENANCE - INSULATION

A visual check of cable/control gear insulation should be performed at regular intervals. If this inspection reveals any change in appearance an insulation resistance measurement is recommended. For older equipment these measurements should be taken on a more regular basis where successive lower readings would indicate a problem.

NOTE: It is important to use insulation testing equipment with care. Electronic components should be securely isolated before employing meggers or similar test methods.

4.11 MAINTENANCE – CONTROL GEAR

A visual inspection should be performed at regular intervals. Movements should be checked for free and unobstructed operation. This is very important for critical safety components (Emergency Stop Pushbuttons and Relays).

5.0 REPLACEMENT PARTS

Use only parts as detailed by the supplier. Failure to do so could impair safety of equipment/personnel, or impair machine operation or the design of the equipment.

5.1 MECHANICAL PARTS LIST

Part Number	Description	Quantity
KPVP050151	Positioner Mainframe Adjustable Height	1
KPVP050152	Baseframe Adjustable Height	1
KPVP050102	Crosshead	1
KPVP050103	Table	1
KPVP050108	Trunnion Shaft	2
KPVP050115	Rotation Box Pad	1
KPVP050118	Rotation Spur Pinion Guard	1
KPVP050117	Rotation Spur Pinion	1
KPVP050204	1.1kW AC Tilt Motor with Brake	1
KPVP050207	Tilt Gearbox	1
KPVP050206	Tilt Spur Pinion	1
KPVP050205	Tilt Quadrant	1
KPVP050220	Earthing Bracket	1
KPVP050222	Earthing Strip	1
KPVP050225	Trunion Flanged Bush	1
KPVP050229	Crosshead Spacer	1
KPVP050240	Slot Cover	6
KPVP050245	Back Frame Guard	1
KPVP050246	Front Frame Guard	1
KPVP050203	1.1kW AC Rotation Motor	1
KPVP050208	Rotation Gearbox	1
KPVP050311	Earthing Brush Assembly	2
KPVP050320	Control Panel Frame	1
KPVP050350	Slewing Ring	1
KPVP050260	Tilt Angle Indicator & Pointer	1
KPVP050261	Tilt Pinion Guard	1
KPVP050262	Tilt Box Pad & Gusset	1
KPVP050161	Height Adjustment Locking Pins	2
KPVP050162	Height Adjustment Stabilising Bolts	4

5.2 ELECTRICAL PARTS LIST



Figure 9 Control Panel Interior



Figure 8 Control Panel Exterior



Figure 7 Control Pendant

Photo Number	Part Number	Description	Quantity
1	KP3010	Inverter 3 Phase 2.2kW Drive (Rotation)	1
2	KP1060	Relay and Base	4
3	KP1008	3 Phase Fuse Holder and Fuses	2
4	KP1010	Transformer 480V/24V 63VA	1
5	KP1042	Reversing Contactor 18A, 24VAC	1
6	KP1032	Motor Circuit Breaker 4.0-6.3A	1
7	KP2009	Phase Detection Relay	1
8	KP1020	2 Pole Circuit Breaker 0.5A	1
9	KP1010	1 Pole Circuit Breaker 3A	1
10	KP1042	Contactor 5.5kW, 12A	1
11	KP1028	Fused Door Isolator	1
12	KP4001	10 Way Earthing Bar	1
13	KP1002	Terminals (Grey)	22
14	KP1001	Earth Terminals (Green/Yellow)	4
15	KP1092	Mains Power On Lamp	1
16	KP1094	Emergency Stop Reset Blue Pushbutton	1
17	KP1090	Emergency Stop Button	1
18	KP1065	Pendant Housing	5
19	KP1068	Pendant Push Buttons (Red, Green, Yellow, Black, White)	1
20	KP2026	Speed Potentiometer	1
21	KP1075	Pendant Emergency Stop Button	1
Not Shown	KPPENCAB	Pendant Cable	15m

APPENDIX A - OVERVIEW DRAWING

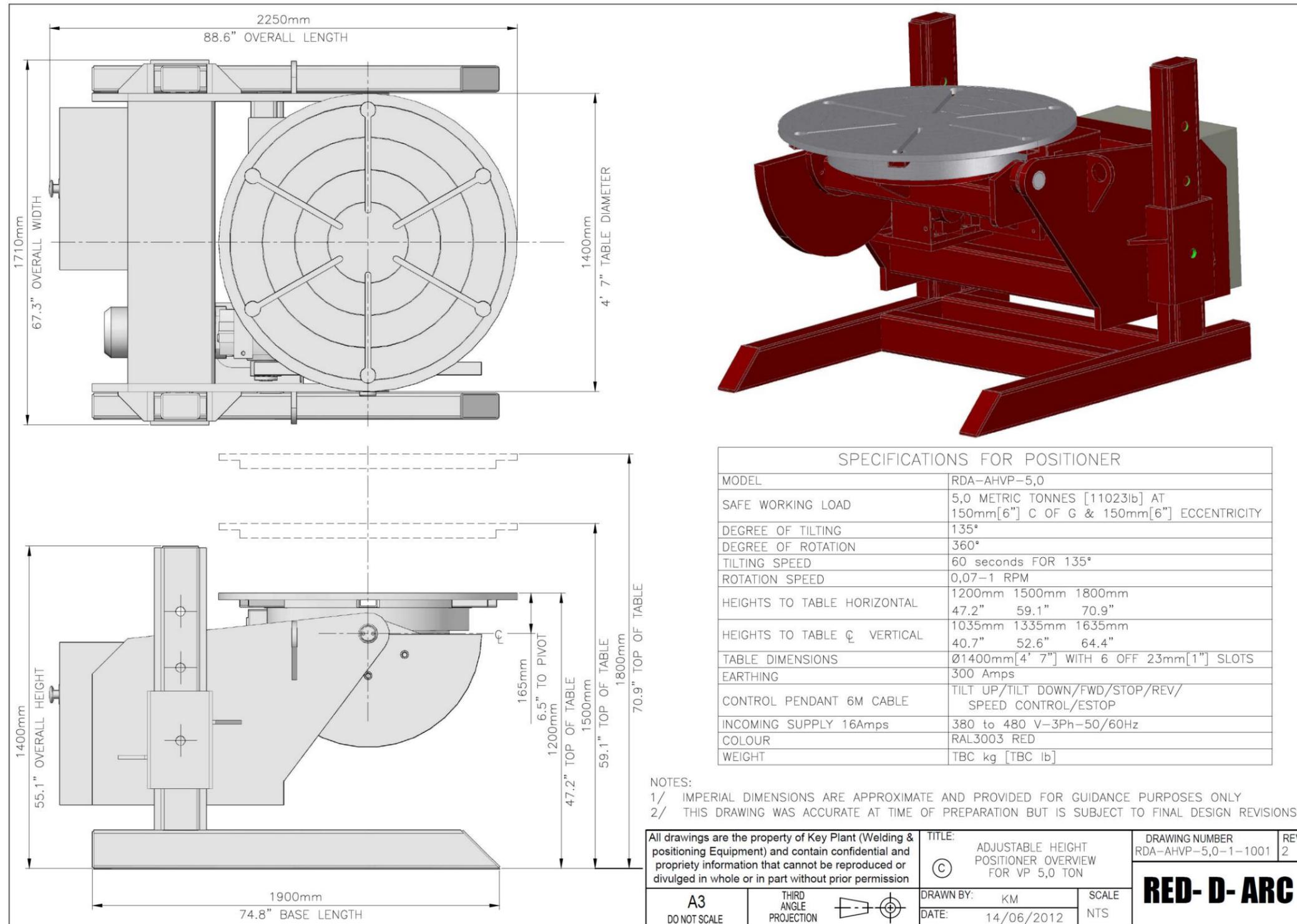


Figure 10 Overview Drawing

APPENDIX C – INVERTER DRIVE PARAMETER SETTINGS

The following settings have been programmed into the inverter at the factory;

Parameter Number	Value	Parameter Number	Value
1	2.5	7	1500
2	62	8	400
3	3.0	9	0.85
4	3.0	10	L3
5	AI.AV	11	0
6	5.10	22	A
39	60		

All other values are as factory set by the inverter manufacturer and need not be altered.

Overloads are set at 4 Amps.

Note: All other values are as factory set.

APPENDIX D – GEARBOX MAINTENANCE

Startup

D.1 Measures before startup

D.1.1 Oil level check

Before connecting up the drive system to the current supply check the oil level or Shut down the gear unit by shutting off the drive unit

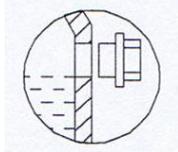


WARNING! Secure drive unit to prevent accidental startup. Affix notice at the switch-on point.



Note: In case of tandem gear units, each single gear unit should be inspected separately. Check oil level with the oil cooled down. Even after a short run, oil needs a longer 'rest' in order to release possible air bubbles.

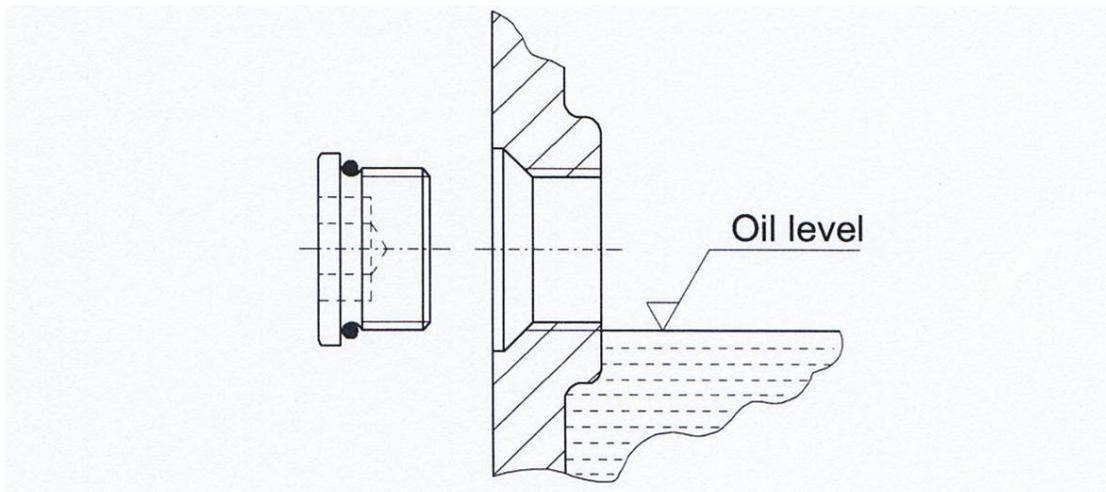
D.1.1.1 Checking the oil level in the gear unit housing



Screw out the plug screw at the point marked with this symbol.



Note: If the oil level is correct, a small amount of oil may flow out; the oil must at least come up to the lower edge of the bore.

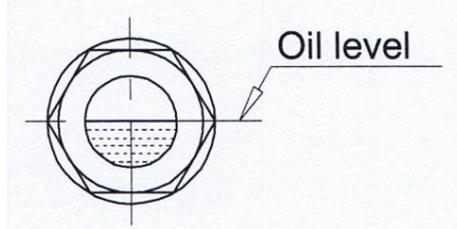


Any oil escaping should be removed immediately with oil binding agent in an environmentally compatible way.

For drives with only one plug screw, checking the oil level is not possible.

D.1.1.2 Oil sight glass (Special feature)

If an oil inspection glass is provided, the oil level must be visible in the middle of the inspection glass.



D.1.1.3 Dipstick (Special feature)

Check oil level with dipstick:

The oil level must be between the lower and upper mark of the dipstick.

D.1.2 Startup without long term preservation

MOTOX® drives are delivered with the appropriate lubricants ready for operation depending on the specified conditions of use.



On gear systems with the required housing ventilation the required ventilator filter is delivered loose with the unit. It must be replaced with the appropriate screw plug before the initial start-up of the gear unit.



It must be used at the position indicated by this symbol.

D.1.3 Startup in case of long term preservation

D.1.3.1 Long term preservation up to 18 months

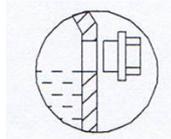


Before starting up the gear unit, it should be filled with lubricant (see D.1.4).

D.1.3.2 Long term preservation up to 36 months



The gear unit is completely filled with oil. Before the start up, the oil level should be corrected according to the type of construction.



The oil level should be reduced to the level marked with this symbol (see D.1.1).



Any oil escaping should be removed immediately with oil binding agent in an environmentally compatible way.

D.1.4 Filling with lubricant

- Screw out venting screw or venting filter or plug screw at the highest point (see 3.2 or point of ventilation).



Fill gear unit up with fresh oil using a filling filter (max. filter coarseness 60 µm). The quantity of oil depends on the mounting position!



Note: Recommendations on the oil to be used should be taken from section 10. "Maintenance and repair."

Data, such as oil grade, oil viscosity and oil quantity required will be found on the rating plate

Finally, check the oil level (see 7.1.1).



Any oil escaping should be removed immediately with oil binding agent in an environmentally compatible way.

D.1.5 Drive with backstop



Secure drive unit to prevent accidental startup. Affix notice at the switch-on point.



Check the direction of rotation before putting into service!

E.g. by manually turning the input shaft or the motor. Check the motor direction of rotation according to the phase sequence, swap two supply leads if necessary.

D.2 Maintenance and repair

D.2.1 General Information on Maintenance



All maintenance and repair work should be carried out with due care and only by thoroughly trained personnel.

The periods listed in the table below, are largely dependent on the conditions of use of use of the gear unit. For this reason, it is only possible to give average periods which refer to a

- **Daily operating time of** **24 h**
- **Duty factor of** **ED 100%**
- **Input drive speed of** **1500 min⁻¹**
- **Max. Oil temperature of** **100°C**

NOTE: Under different operating conditions, the periods should be adjusted accordingly.

Measures	Causes	Remedy
Observe/check gear unit noise for changes	from time to time, more often during operation if possible	-
Observe/check oil temperature	from time to time, more often during operation if possible	-
Oil level check	monthly	see D.1.1
Check gear unit for leakage	monthly	-
Initial oil change after startup	after approx. 10000 operating hours, at the latest after 3 years	see D.2.2.1
Subsequent oil changes	every 3 years or 10000 operating hours	see D.2.2.1
Clean vent plug	every 3 months	see D.2.2.2
Clean drive	according to the degree of contamination	see D.2.2.3
Check all fixing screws for tightness	at least once a year	see D.2.2.4
Carry out complete inspection of gear unit	at least once a year	see D.2.2.5

D.2.2 Description of maintenance and repairs

D.2.2.1 Perform oil change or oil flushing



NOTE : Different types of oil must not be mixed.

- Types of oil:
- mineral oil (CLP oil DIN 51517/3)
 - synthetic oil with a specific base (PGLP-Öl)

Specifications like oil type, oil viscosity and required oil quantity are shown on the name plate.



Oil change and oil flushing:
If using the same type of oil as before, use only that oil.
If using a new oil type, use only the new type.

Thoroughly remove oil sludge, abraded material and used oil residue from the housings by oil flushing.



High-viscosity oils must be warmed beforehand. The oil should be drained off after shutdown, while the gear unit is still warm.

Shut down the gear unit by shutting off the drive unit.



Secure drive unit to prevent accidental startup. Affix notice at the switch-on point.

1. Place a suitable collection receptacle under the oil drain plug of the gear unit housing.
2. Unscrew vent plug on the upper side of the housing.
3. Unscrew oil drain plug and drain oil off into the receptacle.



There is a risk of scalding from the hot oil emerging. Wear protective gloves.

4. Screw in oil drain plug.



Note: Check condition of seal ring, use new seal ring if necessary.

5. Filling with lubricant see D.1.4
6. Screw vent plug on the upper side of the housing.

D.2.2.2 Clean vent plug

The vent plug must be cleaned after deposit of a dust layer – at least every 3 months. For this the filter must be unscrewed, flushed out with cleaning benzene or a similar cleaning agent and dried or blown through with compressed air.



**Ensure adequate ventilation.
Do not inhale vapours.
Do not smoke.
Explosion hazard.**

D.2.2.3 Clean the drive

Shut down the gear unit by shutting off the drive unit.



Secure drive unit to prevent accidental startup. Affix notice at the switch-on point.

Keep drives free of dirt and dust, etc in order to ensure sufficient heat dissipation. Cleaning the drive with a high-pressure cleaning device is not permissible. Do not use sharp-edged tools.

D.2.2.4 Checking all fixing screws for tightness

Shut down the gear unit by shutting off the drive unit.



Secure drive unit to prevent accidental startup. Affix notice at the switch-on point.

Check all fixing screws for tightness with a torque wrench

Thread size	Tightening torque	Property class min.
M 6	10 Nm	8.8
M 8	25 Nm	
M 10	50 Nm	
M 12	90 Nm	
M 16	210 Nm	
M 20	450 Nm	
M 24	750 Nm	
M 30	1500 Nm	
M 36	2500 Nm	

Note: Unserviceable screws should be replaced by new ones of the same property class and type.

D.2.2.5 Inspection of the drive

The drive should be checked annually

In addition, the drive should be checked according to the criteria described in section 2. "Safety notes," e.g. check tight fit of the protective devices.

Any damage of the coating should be repaired by an expert.

D.2.3 Lubricants

Oil selection should always be determined by the oil viscosity (ISO VG class) specified on the rating plate of the gear unit. The viscosity class is valid for the operating conditions agreed on by contract.

Under different operating conditions, it will be necessary to consult us.

We have put together a list of suitable lubricants for the gear unit in the table below.

We are acquainted with the composition of these lubricants and know that in accordance with the latest technology, they possess values in respect of loadability, corrosion protection, load carrying capacity with micro-pitting, as well as compatibility with seals and internal coating on which the design of the gear unit has been based.

Thus we recommend that our customer should select a lubricant from this table, taking in account the viscosity class stated on the rating plate.

The lubricants listed have no approval according to USDA –H1/-H2 (United States Department of Agriculture) and are as such not, or only limited approved, for use in the food or pharmaceutical industry. The lubricants are not, or only limited biologically decomposable. They are usually according to the Classes 2 or 1 of hazard for water.

If lubricants are necessary according to these classifications, please contact the factory.

If the gearboxes are filled with special lubricants from the factory for the cases given above, this can be seen on the name plate e.g. CLP-H1 VG220 or CLP E VG220.

Note: As a precaution against misunderstandings, we would like to point out that the recommendation does not imply any release in the sense of a warranty for the quality of the lubricant provided by your supplier. Each lubricant manufacturer must warrant the quality of his product himself.

If you do not follow our recommendations, you must take the responsibility for the technical suitability of the lubricant.

In the case of synthetic oils not listed in the table below, the corrosiveness of the oil to our internal coating should be checked. A check of this nature is carried out by us at cost (cost on request)

Lubricant	Designation according to DIN 51502	Examples of lubricants										
												
Synthetic Oils 2)	OIL PGLP ISOVG460	Degol GS460	Enersyn SG-XP 460	Polydea PGLP460	GLYCO-LUBE 460	Renodiol PGP460	Syntheso D460EP	Glygoyle HE460	Optiflex A460	TIVELA OIL SD		TRIBOL 800/460
	OIL PGLP ISOVG220	Degol GS220	Enersyn SG-XP 220	Polydea PGLP220	GLYCO-LUBE 220	Renodiol PGP220	Syntheso D220EP	Glygoyle 30	Optiflex A220	TIVELA OIL WB		TRIBOL 800/220
Lithium saponified anti-friction bearing greases NLGI 3/2		Aralub HL3, HL2	Energrease LS3, LS2	Glissando 30, 20	BE-ACON 3	Renolit FWA220, FWA160	CEN-TRO-PLEX GLP402	Mobilux 3, 2	Longtime PD2	ALVANIA R3, R2	Wiolub LFK2	TRIBOL 4020/220-2

We would be pleased to recommend further suitable lubricants of the makes ADDINOL, CASTROL, FUNCHS Lubritech, OMV, STATOIL, TEXACO, TUNAP and VALVOLINE.

Synthetic lubricants (polyglycols) in accordance with designation PGLP as per DN51 502. These oils are distinguished by their high aging resistance and favourable effect on the efficiency of the gear unit.

They are suitable for the following operating temperatures:

PGLP ISO VG 220: -30°C ... +100°C

PGLP ISO VG 460: -15°C ... +100°C

The maximum temperatures can be exceeded by 10K for a short time.



Note: If operating temperature of the drive exceeds or undershoots the limit valves, the oil selected should be checked for suitability.

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