

OPERATION MANUAL

CONVENTIONAL POSITIONER

Model VP0.7-CE

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1.0 PREFACE

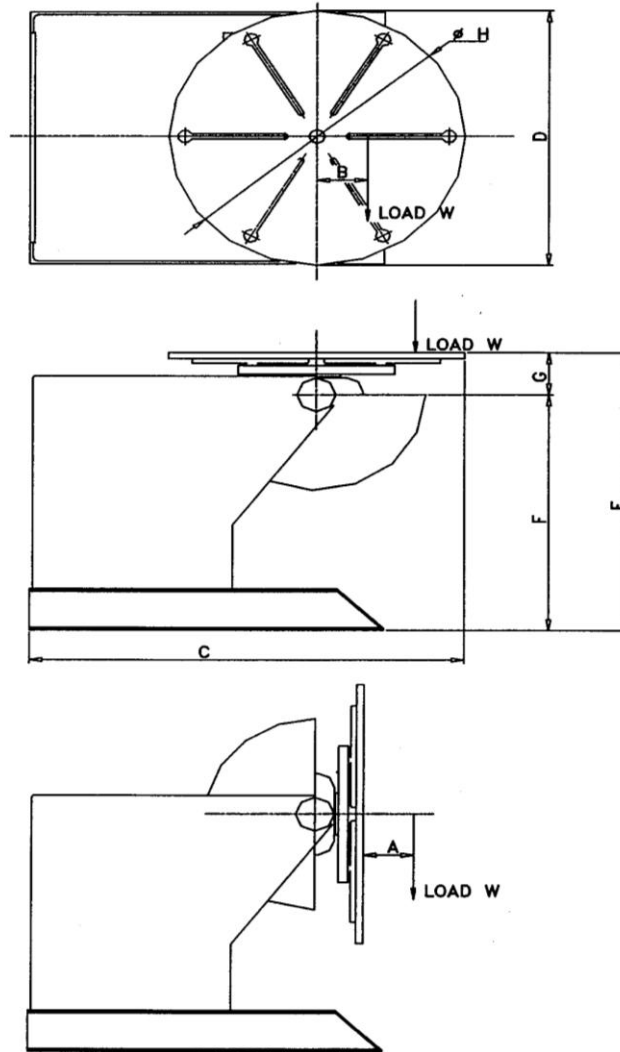
This user's manual describes the everyday use and maintenance of our Welding Positioners. Any actions that are required to be carried out by the manufacturer have not been included in this manual.

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

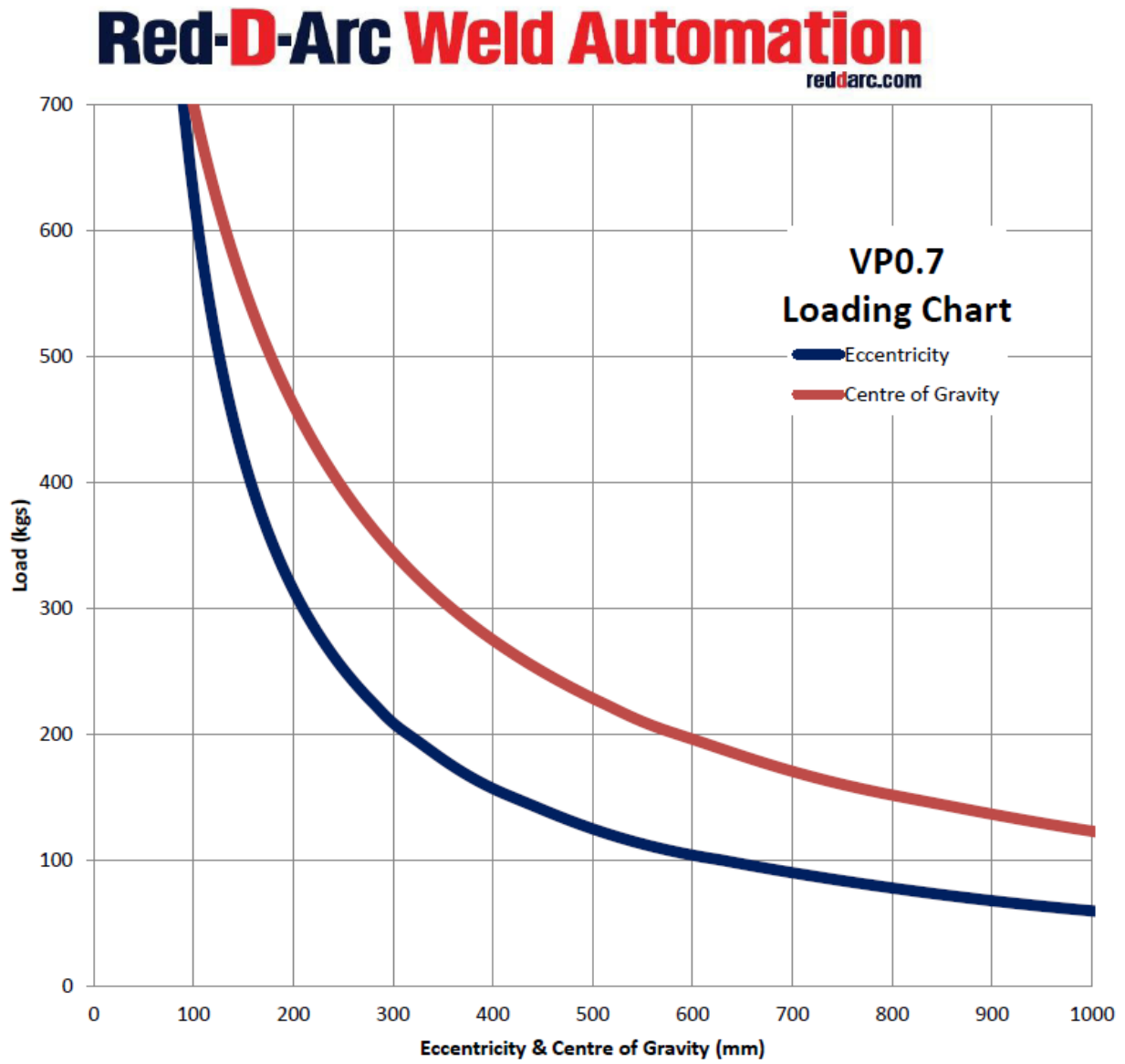


Figure 2 Loading Chart

1.4 SPECIFICATION

Load Capacity	:	700kgs @ 100mm eccentricity & 100mm C.O.G.
Table Diameter	:	750mm
Degree of Table Tilting	:	135°
Degree of Table Rotation	:	360°
Table Rotation Speed	:	0-1.2 RPM
Table Tilting Speed	:	30 seconds through 135°
Overall Height Table Level	:	850mm

Table machined with concentric circular markings and 4 off 15mm (19/32") slots.

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

Table rotation fitted with AC motor and controlled by an inverter unit suitable for 380V/480V 3 Phase 60Hz Supply.

Tilting through inverter controlled 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 for table rotation speed. Connected with 8 meters of cable to the control panel.

Mains electrical supply suitable for 380V/480V 3 Phase 60Hz.

1.5 CE CERTIFICATE OF CONFORMITY**Machine Type** 700KG Welding Positioner**Model** VP0.7

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;

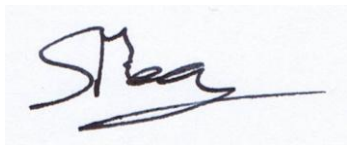
Supply of machinery (Safety) Regulations implementing the EC Machinery Directive 89/392/EEC amended 91/368/EEC and 93/44/EEC and 93/68/EEC codified to 98/37/EC.

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

2.0 INSTALLATION

Remove transport protection (if any) from the machine.

Locate the machine on a level floor that is capable of withstanding approximately 2.5 tonnes over the contact area.

Connect the electrical mains to the machine, 380V/480V 3 Phase, 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)*

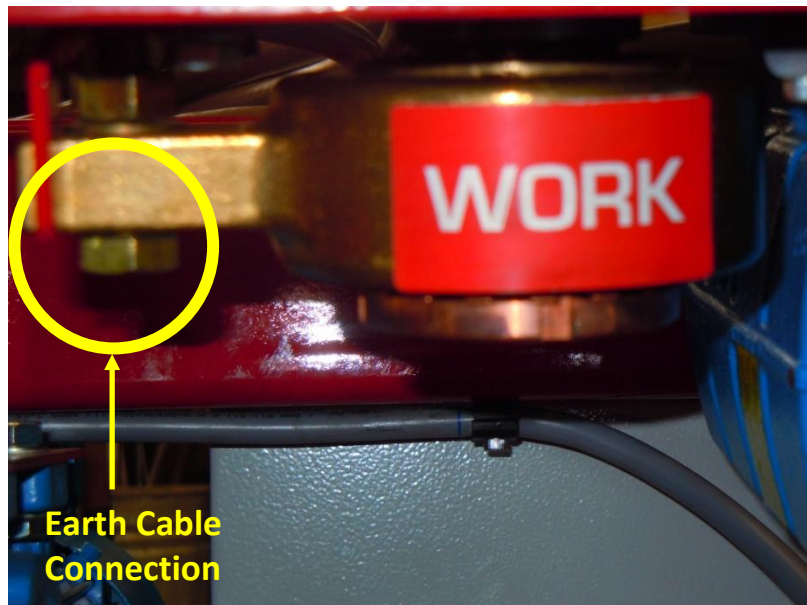


Figure 3 Photo of Earthing Point

Before making the machine fully operational, remove any necessary covers and check that the 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. Emergency Stop Button
4. Panel door opening key
5. Door electrical isolator, must be turned off before panel door can open.



Figure 4 Main Panel

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
BUTTON D	Table Rotation Stop Push Button
BUTTON E	Table Rotation Forward Direction Push Button
DIAL F	Rotation Speed Potentiometer
BUTTON G	Emergency Stop Push Button

4.0 MAINTENANCE

4.1 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.

4.2 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.

4.3 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 mal-operation 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 mal-operation.

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:

4.4 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.

4.5 MAINTENANCE - TIGHTNESS OF CONNECTIONS

It will be necessary to periodically check the tightness of terminals and bus-bar 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.

4.6 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.

4.7 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 ELECTRICAL PARTS LIST

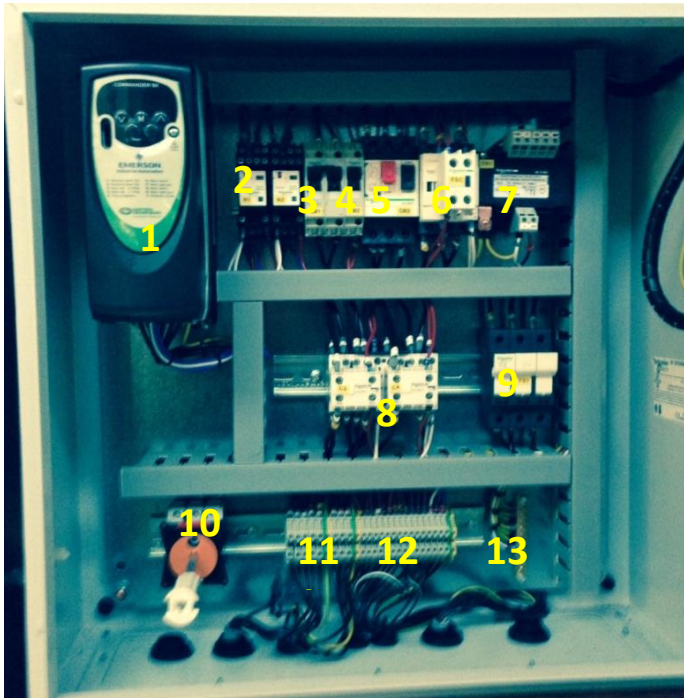


Figure 6 Control Panel Interior



Figure 8 Control Panel Exterior



Figure 7 Control Pendant

Photo Number	Part Number	Description	Quantity
1	KP3007	Inverter Drive (Rotation) 3 Phase 0.55kW	1
2	KP1030	Relay and Base	2
3	KP1021	2 Pole Circuit Breaker 2A	2
4	KP1011	1 Pole Circuit Breaker 4A	1
5	KP1030	Motor Circuit Breaker 1.6A-2.5A	1
6	KP1037	Emergency Stop Contactor	1
7	KP1004	Transformer 440V/24V 63VA	1
8	KP1040	Reversing Contactor	2
9	KP1006	Fuse Holder + Fuses	1
10	KP1062	Door Isolator	1
11	KP1001	Earth Terminals (Green/Yellow)	3
12	KP1002	Terminals (Grey)	22
13	KP4001	10-Way Earthing Bar	1
14	KP1068	Power On Light	1
15	KP1074	Emergency Stop Reset Button	1
16	KP1090	Emergency Stop Button	1
17	KP1065	Pendant Housing	1
18	KP1068	Pendant Push Buttons (Red, Green, Yellow, Black, White)	5
19	KP2026	Speed Potentiometer	1
20	KP1075	Pendant Emergency Stop Button	1
Not Shown	KPPENCAB	Pendant Cable	15m

APPENDIX A - OVERVIEW DRAWING

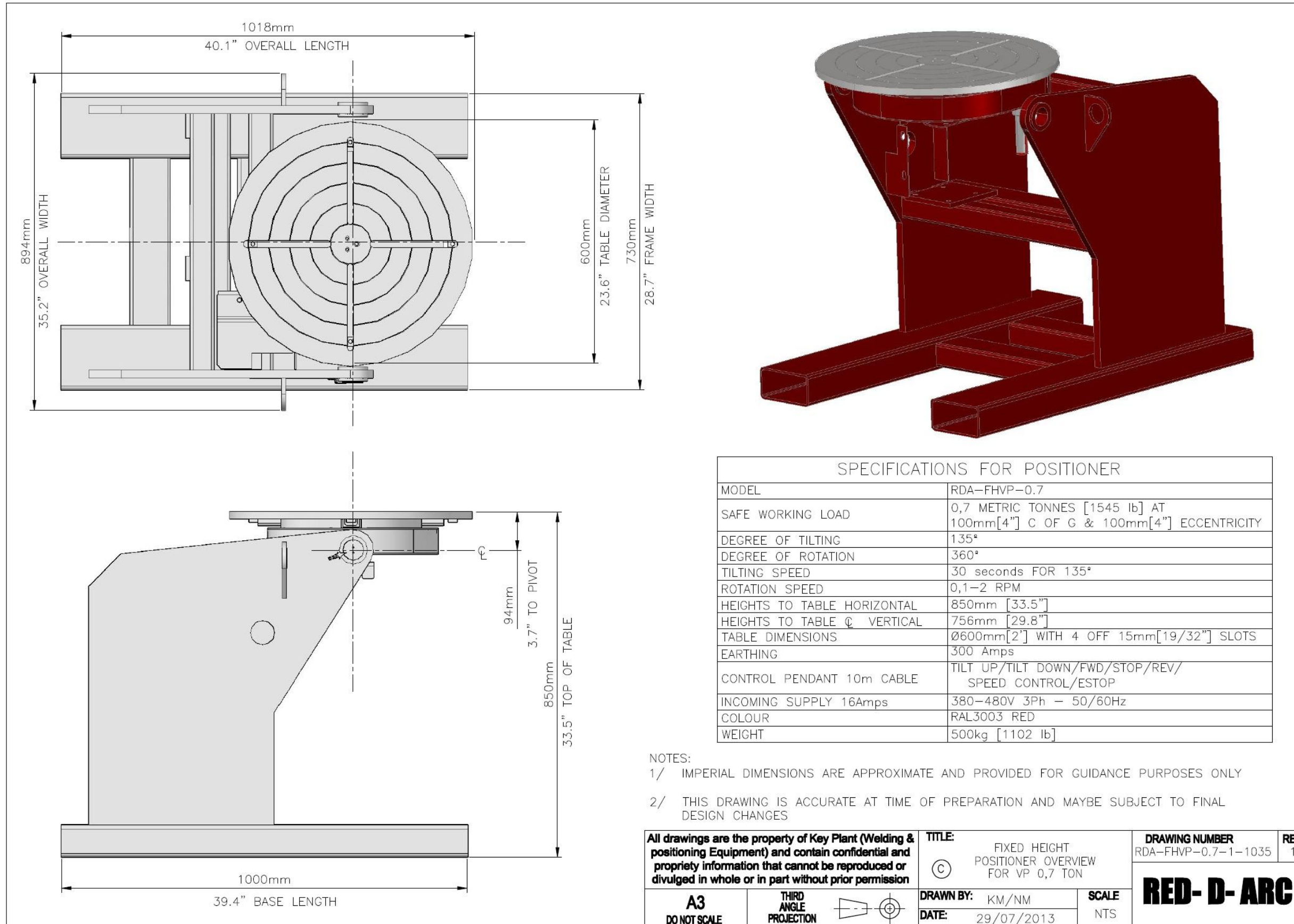


FIGURE 9 OVERVIEW DRAWING

APPENDIX B – WIRING DIAGRAM

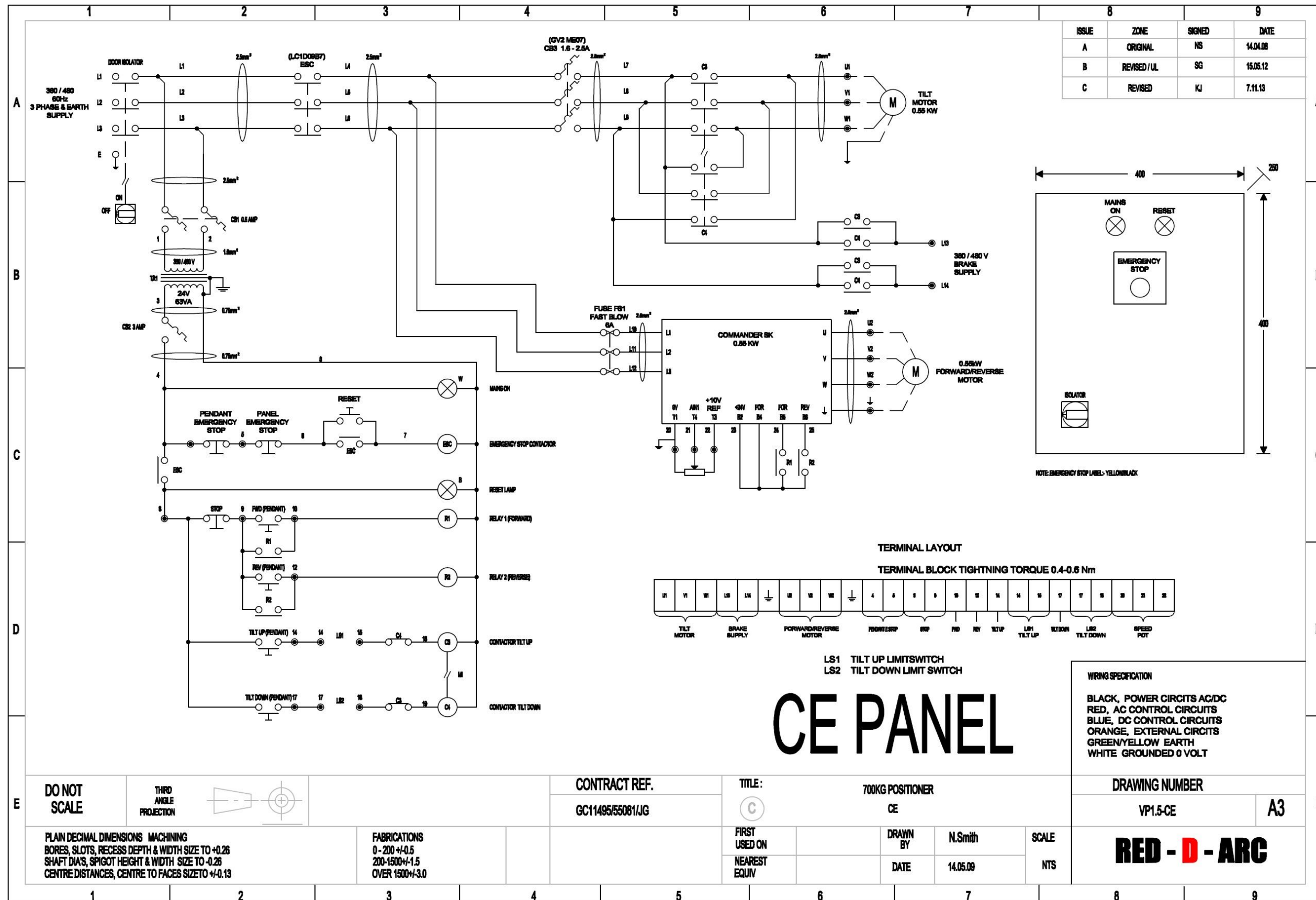


FIGURE 11 WIRING DIAGRAM

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	1680
2	70	10	L3
3	2	22	A
4	2	39	60
6	2.9		

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

Tilt Overloads set to 1.8A

APPENDIX A – TILT AND ROTATION GEARBOX MAINTENANCE

Startup

A.1 Measures before startup

A.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

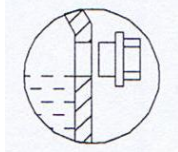


WARNING! Secure drive unit to prevent accidental start-up. Affix notice at the switch-on point.



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.

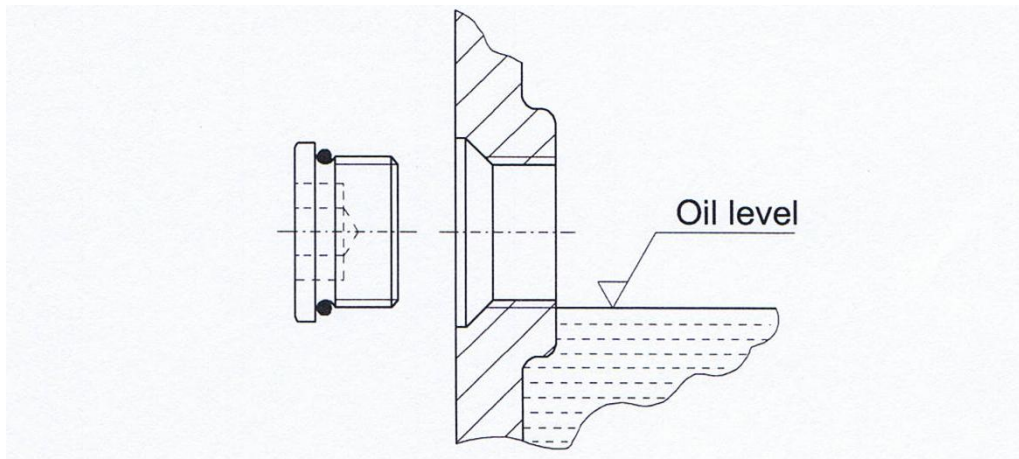
A.1.1.1 Checking the oil level in the gear unit housing



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.

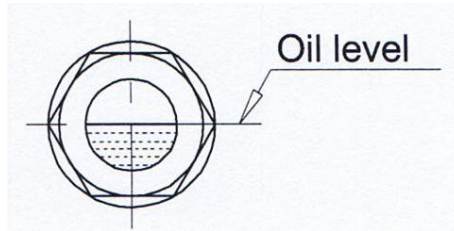


Any oil escaping should be removed immediately with oil binding agent in an environmentally compatible way.

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

A.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.



A.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.

A.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.

A.1.3 Startup in case of long term preservation

D.1.3.1 Long term preservation up to 18 months

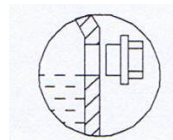


Before starting up the gear unit, it should be filled with lubricant (see D.1.4).

A.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.

A.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.

A.1.5 Drive with backstop



Secure drive unit to prevent accidental start-up. 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.

A.2 Maintenance and repair

A.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 spe**
- **ed 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

A.2.2 Description of maintenance and repairs

A.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 start-up. 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.

A.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.**

A.2.2.3 Clean the drive

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



Secure drive unit to prevent accidental start-up. 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.

A.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 start-up. 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.

A.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.

A.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	Energreae 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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