



Electric Water Cannon RM65E With A/E Butterfly Valve

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1. Water Cannon - Warning - Hazard to Health

Care needs to be taken operating a water cannon. Water from a cannon is capable of inflicting serious injury to a person in the path of the jet.

Primary injuries would be those from the direct hit to the body by the impact of the jet. These would include bruising of internal organs and damage to the eyes.

Secondary injuries can occur as a result of the acceleration of the body in collision with hard surfaces. These injuries would be largely skeletal, such as broken bone. Other injuries could be caused by debris, accelerated by the force of the water jet striking the person.

The following should be considered as a minimum level of care required when operating a water cannon:

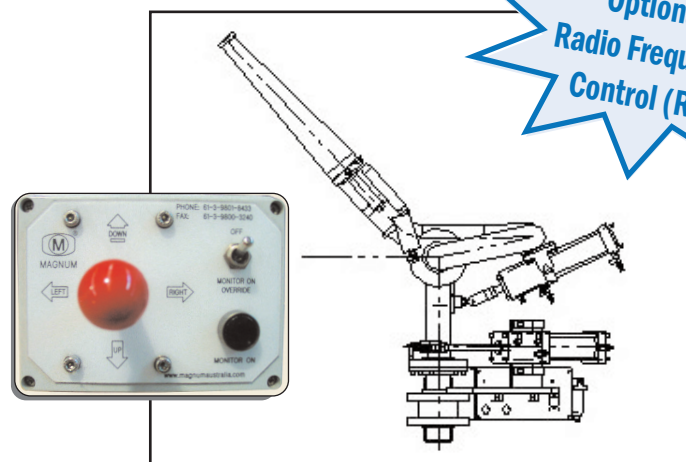
- Know the direction that the cannon is aiming at. Aim the cannon in a safe direction before turning the water on.
- Keep all personal out of the front of the cannon. Dangerous flow velocities can cause serious injury for quite a distance in front of the cannon.
- The cannon contain moving parts. Keep hands, fingers, and objects away from pinch points when working close to the cannon.
- Do not attempt to modify the equipment in any way. Modifications of the equipment may result in damage and/or malfunction of the equipment which could cause injury to the operator or other. Also, the manufacturer's warranty will be void.
- Follow all the maintenance procedures in the documentation. Failure to do so, can result in damage and/or malfunction of the equipment which could cause injury to the operator or other.



2. RM65E Brochure



- Electric driven slew and elevation
- Automatic grease lubrication optional
- 90° slew (maximum)
- 70° elevation (as standard), 45° above horizontal, and 25° below horizontal)
- Electric 4-ways joystick controller supplied
- Unit pre-set to correct settings and tested prior to final packaging and dispatch
- 12V or 24V available
- Mounting flange with fasteners included
- Option of air or electric to turn water on/off
- Optional remote foam/fog nozzle available operated by air or electrics
- Optional radio frequency (R.F.) control available
- 65mm (2 1/2") ANSI 150lb flanged inlet connection
- Director nozzle supplied as standard; 28mm (1 1/8") orifice and 60 m water throw at 7 bar
- Power requirements; 24V 4A - 12V 8A

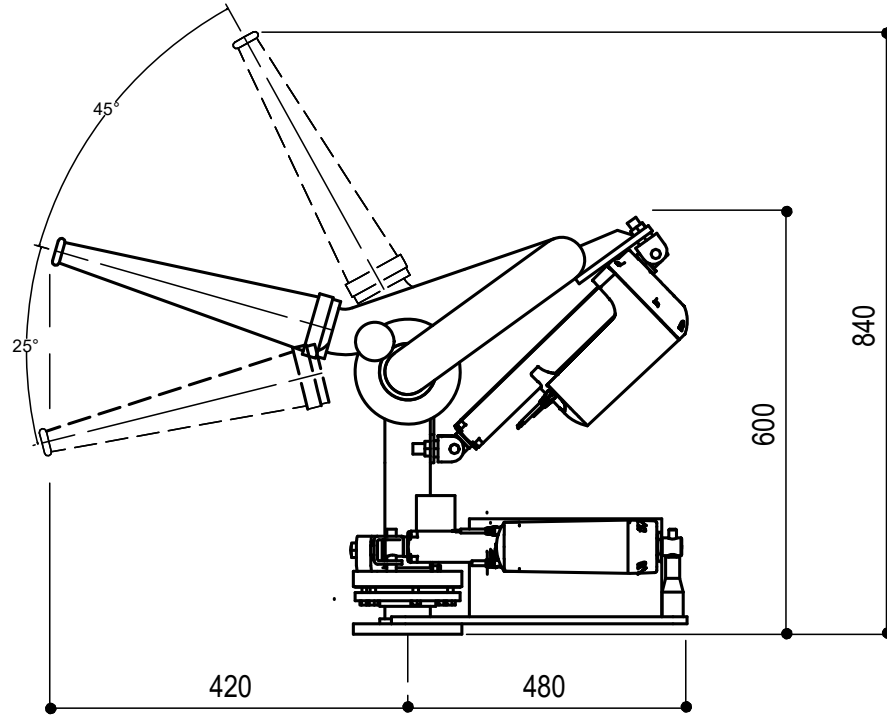


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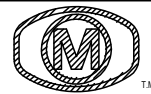
NOTES:

1. Slew angle 90°
2. Elevation angle 45° above horizontal and 25° below horizontal (can be changed to suit customers requirements).
3. Mounting face / inlet 2 1/2" (65 mm) ANSI 150 lb flange
4. Nozzle outlet 28 mm diameter
5. Weight approximately 58 Kg



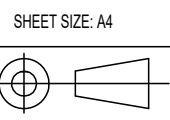
ISSUE	REVISION	DRAWN	DATE	APPD.
DRAWINGS SUBJECT TO FINAL DESIGN UNLESS CONFIRMED				
CONFIRMED BY:	SIGNATURE:	DATE:		

EXCEPT WHERE NOTED ALL DIMENSIONS IN MILLIMETRES



MAGNUM AUSTRALIA

35 PARKHURST DRIVE KNOXFIELD
VICTORIA 3180
PHONE 9801 8433



SHEET SIZE: A4

TOLERANCES UNLESS NOTED
 WHOLE DIMENSIONS ±0.50
 ONE DECIMAL PLACE ±0.25
 TWO DECIMAL PLACES ±0.10
 ANGLES ±30'

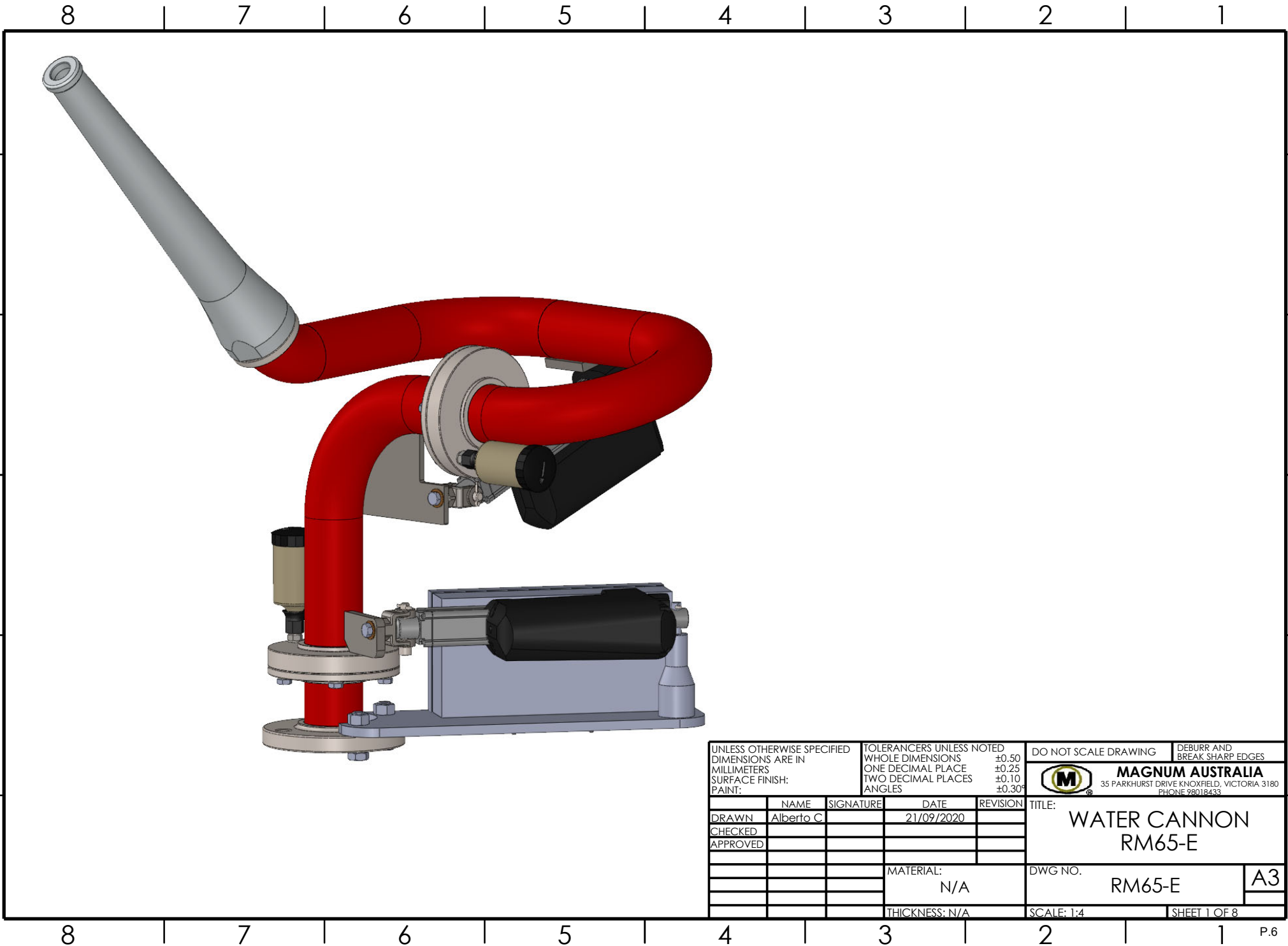
SCALE	NTS
DRAWN	Alberto
DATE	16/11/20
CHECKED	
DATE	


RM65 - E GENERAL ASSEMBLY

SHEET 1 OF 1 SHEETS
 DRG. No. RM65 - E



3. Outline Drawing of Cannon & Exploded View / Spare Parts

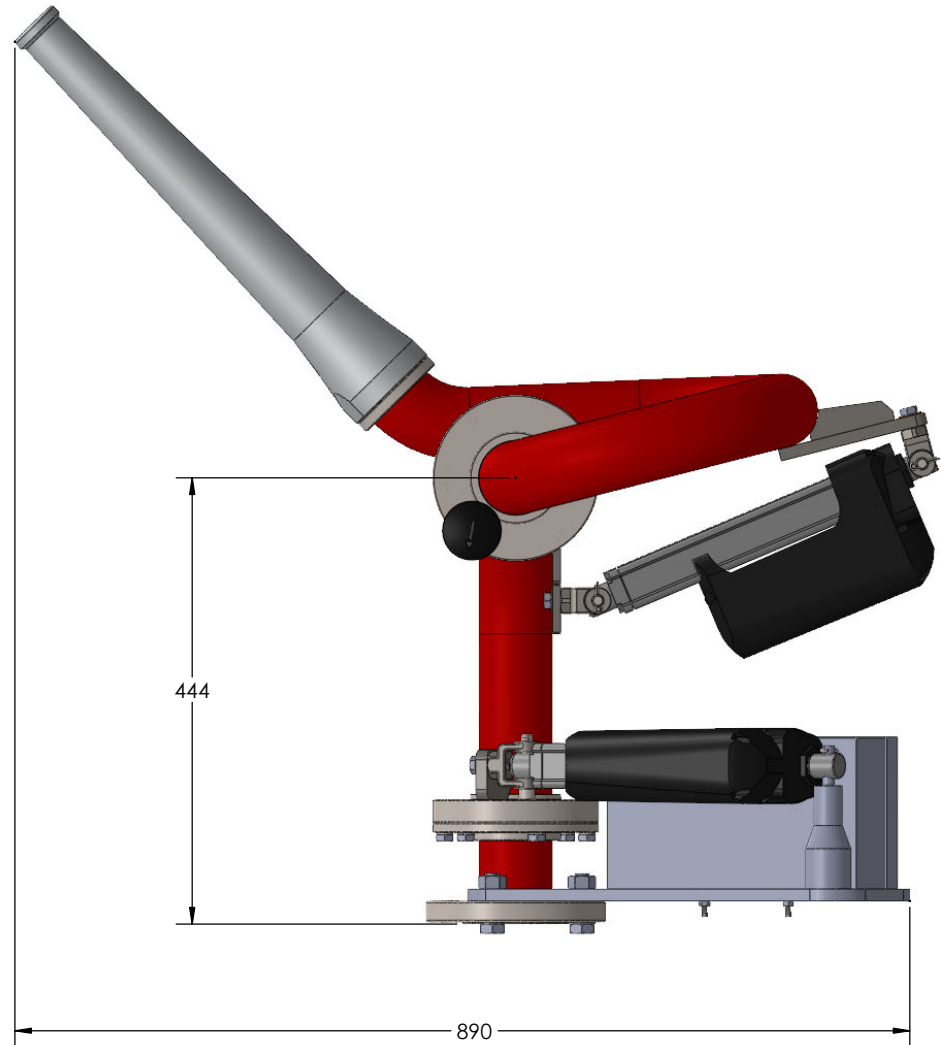
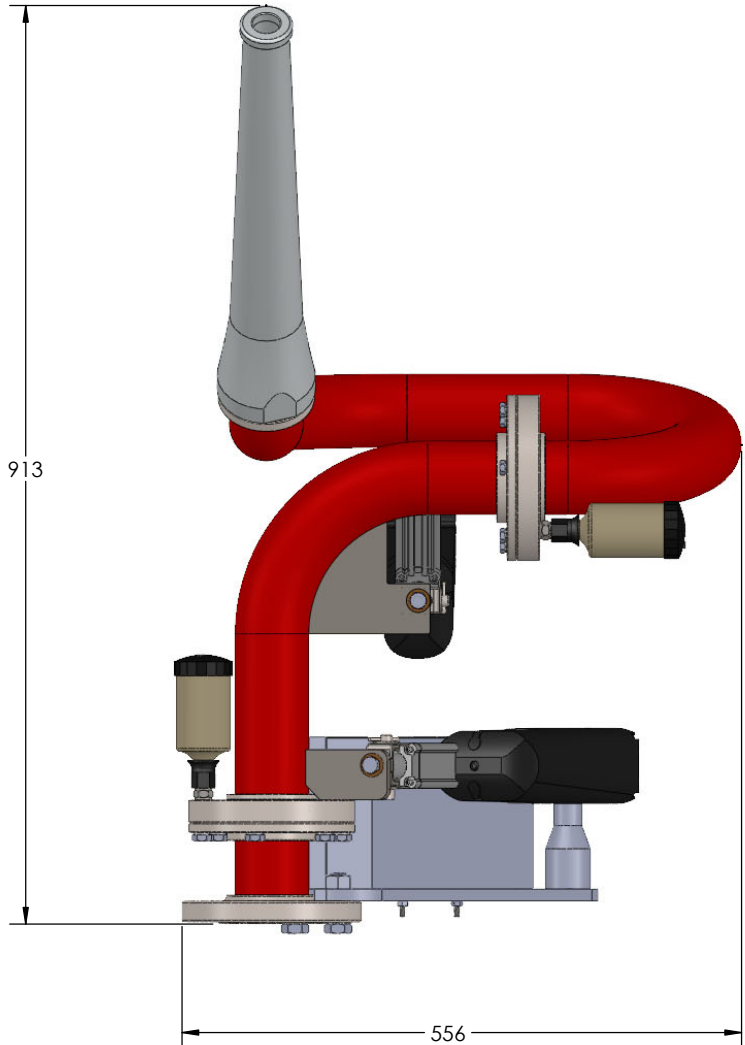


UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS		TOLERANCES UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING	DEBURR AND BREAK SHARP EDGES
SURFACE FINISH: PAINT:				 MAGNUM AUSTRALIA <small>35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 22018433</small>	
	NAME	SIGNATURE	DATE	REVISION	TITLE:
DRAWN	Alberto C		21/09/2020		WATER CANNON RM65-E
CHECKED					
APPROVED					
					DWG NO.
					RM65-E
					A3
					MATERIAL: N/A
					THICKNESS: N/A
					SCALE: 1:4
					SHEET 1 OF 8


8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

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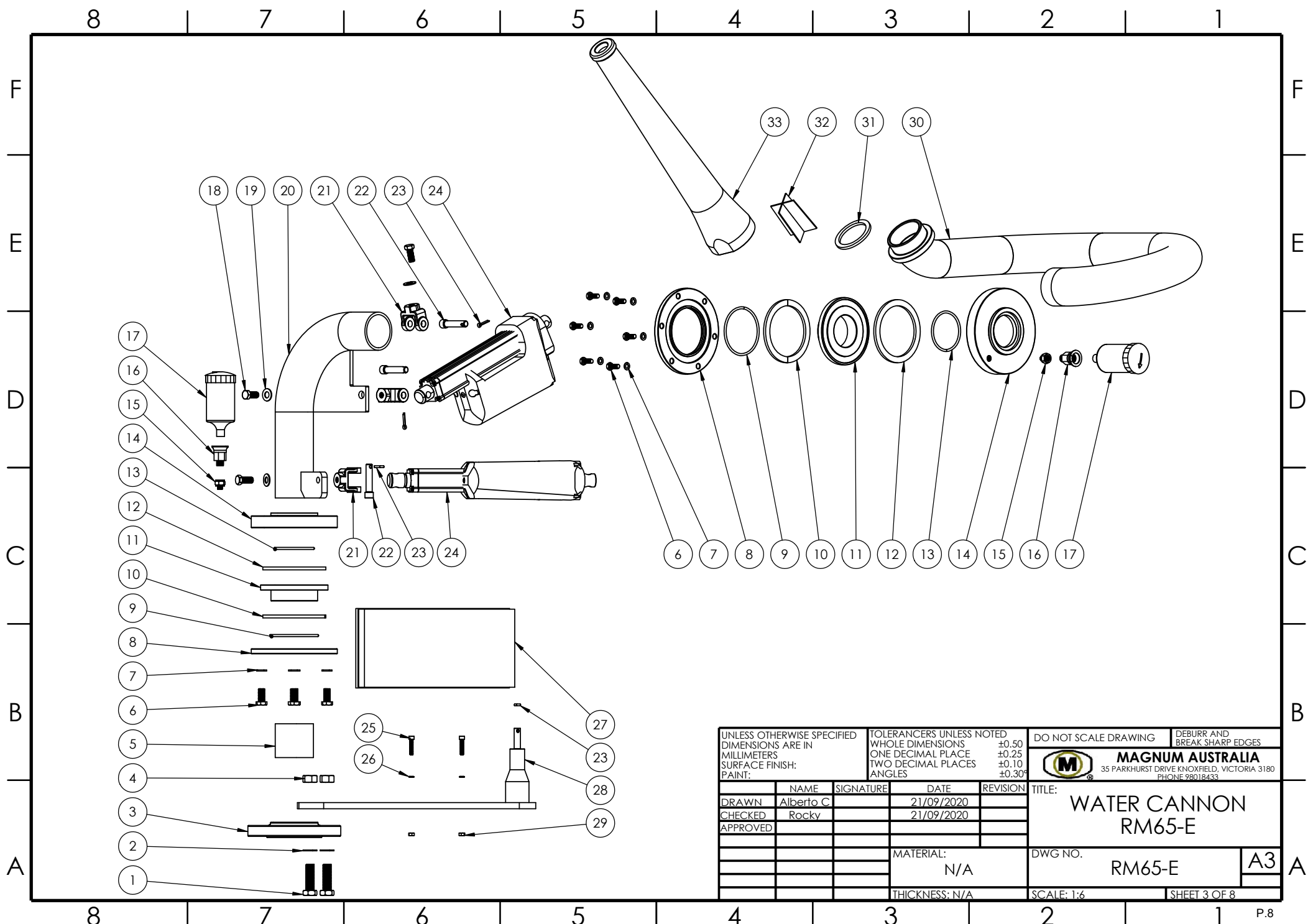
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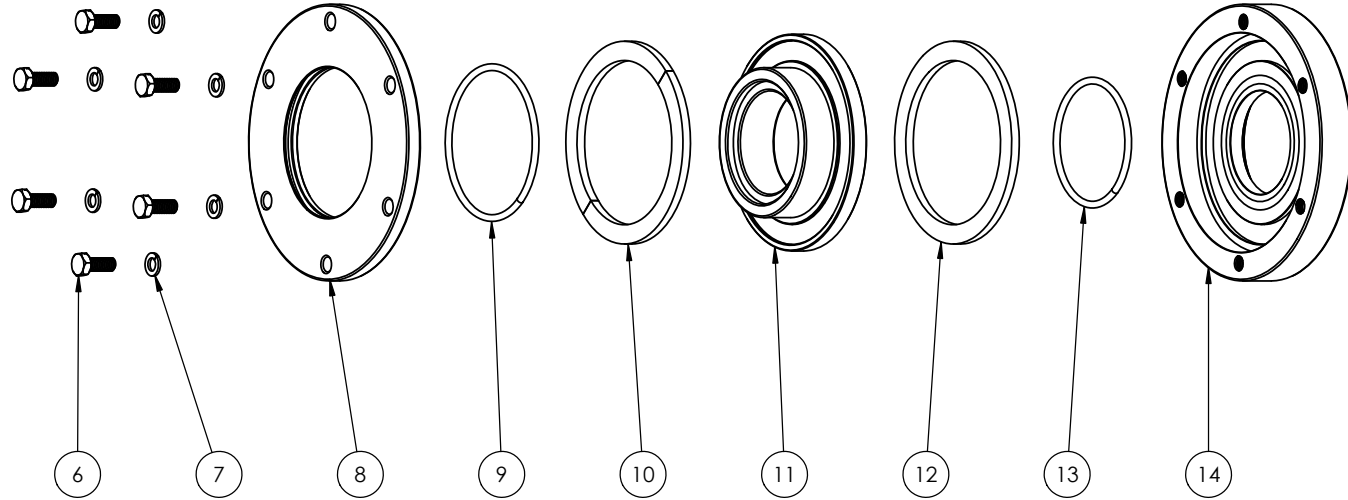
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				 MAGNUM AUSTRALIA 35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 28018433	
DRAWN	Alberto C	SIGNATURE	DATE	REVISION	TITLE:
CHECKED	Rocky		21/09/2020		WATER CANNON RM65-E
APPROVED			21/09/2020		
					DWG NO.
					RM65-E
					THICKNESS: N/A
					SCALE: 1:5
					SHEET 2 OF 8

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: PAINT:		TOLERANCES UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING	DEBURR AND BREAK SHARP EDGES
				 MAGNUM AUSTRALIA 35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 98018433	
DRAWN	Alberto C	SIGNATURE	DATE	REVISION	TITLE:
CHECKED	Rocky		21/09/2020		WATER CANNON RM65-E
APPROVED			21/09/2020		
		MATERIAL:		DWG NO.	
		N/A		RM65-E	
		THICKNESS: N/A		SCALE: 1:6	
				SHEET 3 OF 8	

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



FOR CUSTOMER INFORMATION

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
6-7-8-9-10-11-12-13-14	BM0805	COMPLETE BEARING FOR RM65-E	2
9-10-12-13	WB-RK2	BEARING RECONDITIONING KIT FOR RM65-E	2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS		TOLERANCERS UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING	DEBURR AND BREAK SHARP EDGES
SURFACE FINISH:		PAINT:		 MAGNUM AUSTRALIA <small>35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 22018433</small>	
	NAME	SIGNATURE	DATE	REVISION	TITLE:
DRAWN	Alberto C		21/09/2020		COMPLETE BEARING FOR RM65-E
CHECKED	Rocky		21/09/2020		
APPROVED					
MATERIAL:			N/A		DWG NO.
THICKNESS: N/A					BM0805
SCALE: 1:3				SHEET 4 OF 8	

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 P.9

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

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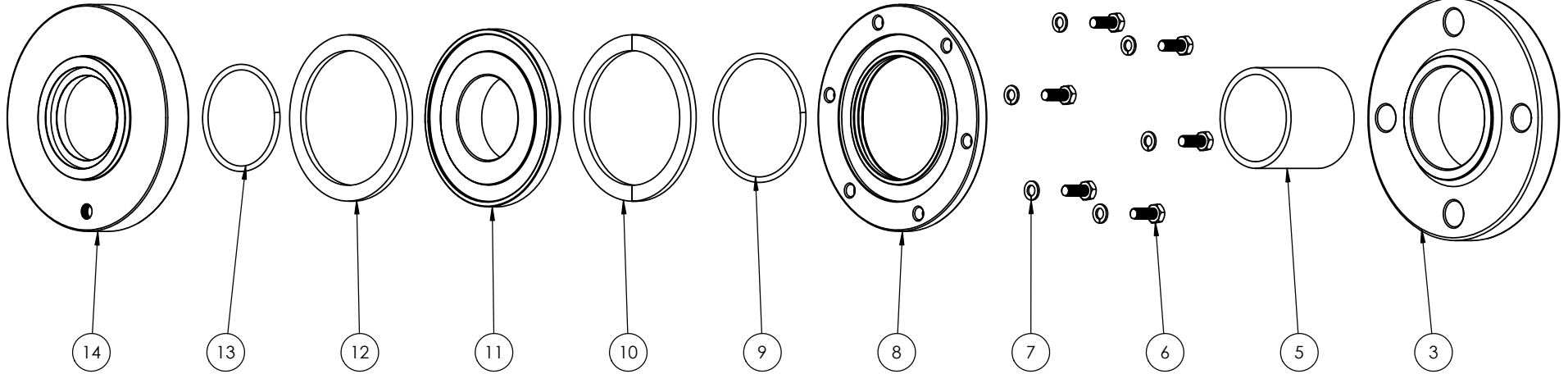
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FOR CUSTOMER INFORMATION

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
3-5-6-7-8-9-10-11-12-13-14	BM0805-AS	COMPLETE BEARING WITH FLANGE FOR RM65-E	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS		TOLERANCES UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING	DEBURR AND BREAK SHARP EDGES																
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NAME	SIGNATURE	DATE	REVISION																		
DRAWN	Alberto C	21/09/2020																			
CHECKED	Rocky	21/09/2020																			
APPROVED																					
				TITLE: COMPLETE BEARING WITH FLANGE FOR RM65-E																	
				DWG NO. BM0805-AS																	
				A3																	
				SCALE: 1:3																	
				SHEET 5 OF 8																	
				THICKNESS: N/A																	

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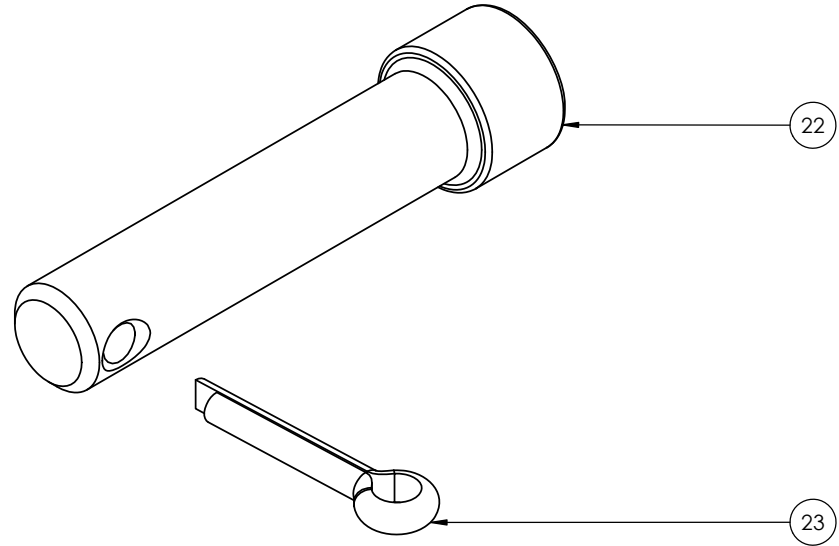
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FOR CUSTOMER INFORMATION

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
22-23	RM0028-E-AS	CLEVIS PIN KIT FOR RM65-E	3

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS		TOLERANCES UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING	DEBURR AND BREAK SHARP EDGES
SURFACE FINISH:		PAINT:		 MAGNUM AUSTRALIA <small>35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 22018433</small>	
DRAWN Alberto C		SIGNATURE			
CHECKED Rocky		DATE		DWG NO. RM0028-E-AS	
APPROVED		REVISION		SCALE: 2:1	
		MATERIAL: N/A		SHEET 6 OF 8	
		THICKNESS: N/A		P.11	

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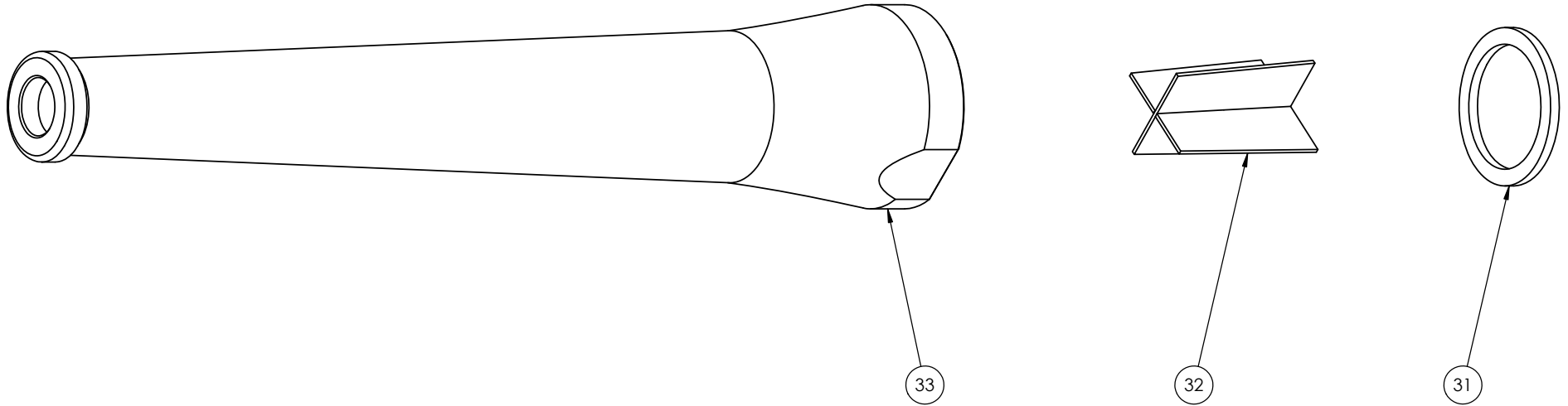
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FOR CUSTOMER INFORMATION

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
31-32-33	BM0015-AS	NOZZLE KIT FOR RM65-E	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS		TOLERANCERS UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING	DEBURR AND BREAK SHARP EDGES
SURFACE FINISH:		PAINT:		 MAGNUM AUSTRALIA <small>35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 28018433</small>	NOZZLE KIT FOR RM65-E
DRAWN	Alberto C	SIGNATURE	DATE		
CHECKED	Rocky		21/09/2020		
APPROVED					
		MATERIAL: N/A		TITLE:	
		THICKNESS: N/A		DWG NO. BM0015-AS	
				SCALE: 1:2	
				SHEET 7 OF 8	


8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M16X50-SS	M16X50X2 HEX HEAD SCREW	2
2	M16-SW-SS	M16 SPRING WASHER	2
3	PF65	65 mm ANSI FLANGE	1
4	M16NUT-SS	M16 NUT	2
5	MM65-STB-65-L	65 mm STUB	1
6	M8X20-SS	M8X20X1.25 HEX HEAD SCREW	12
7	M8-SW-SS	M8 SPRING WASHER	12
8	MB65-004	BEARING LID (TOP RACE)	2
9	WBR70-90X4	O-RING 90X4 (TOP RACE)	2
10	MB65-006	VESCO RING (2 PIECES)	2
11	MB65-003	BEARING (MIDDLE RACE)	2
12	M65-005	VESCO RING (1 PIECE)	2
13	WBR70-70X4	O-RING 70X4 (BEARING BASE)	2
14	MM65-002	BEARING BASE (BOTTOM RACE)	2
15	P-25101-8-1-4	REDUCER UPPER PERMALUBLE SUPPORT FLANGE	2
16	A620PFLEX	PERMALUBLE SUPPORT FLANGE	2
17	BM007	GREASE CAPSULE	2
18	M12X25-SS	M12X25X1.25 HEX HEAD SCREW	3
19	M12-FW-SS	M12 WASHER	3
20	RM65MK5-029A	CENTRE SECTION RM65-E	1
21	HYDCYL20B	ELECTRIC ACTUATOR CLEVIS	3
22	RM0028-E	CLEVIS PIN	3
23	SP01	SPLIT PIN	3
24	RM65E-01-24	ELECTRIC CYLINDER 150-LA36	2
25	M6X30-SHCS-SS	M6X30X1 SOCKET HEAD SCREW	2
26	M6-SEALW	M6 SEALING WASHER	2
27	RM65E-MAG-ENCLOS	ENCLOSURE RM65-E ELECTRICAL BOX	1
28	RM65E-021	MOUNTING PLATE	1
29	M6-FW-SS	M6 NUT	2
30	RM65-005A-E	TOP SWEEP	1
31	BM-0015C	NOZZLE GASKET	1
32	BM-0015B	FLIGHT SET	1
33	BM0015	2-1/2 MAGNUM DIRECTOR NOZZLE	1

FOR CUSTOMER INFORMATION

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
8-9-10-11-12-13-14	BM0805	COMPLETE BEARING FOR RM65-E	2
3-5-6-7-8-9-10-11-12-13-14	BM0805-AS	COMPLETE BEARING WITH FLANGE FOR RM65-E	1
9-10-12-13	WB-RK2	BEARING RECONDITIONING KIT FOR RM65-E	2
22-23	RM0028-E-AS	CLEVIS PIN KIT FOR RM65-E	3
31-32-33	BM0015-AS	NOZZLE KIT FOR RM65-E	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: PAINT:		TOLERANCES UNLESS NOTED WHOLE DIMENSIONS ±0.50 ONE DECIMAL PLACE ±0.25 TWO DECIMAL PLACES ±0.10 ANGLES ±0.30°		DO NOT SCALE DRAWING		DEBURR AND BREAK SHARP EDGES		
				 MAGNUM AUSTRALIA 35 PARKHURST DRIVE KNOXFELD, VICTORIA 3180 PHONE 98018433		TITLE: WATER CANNON RM65-E		
DRAWN	Alberto C	SIGNATURE	DATE					REVISION
CHECKED	Rocky		21/09/2020					
APPROVED						DWG NO. RM65-E		
		MATERIAL:		A3				
		N/A						
		THICKNESS: N/A		SCALE: N/A		SHEET 8 OF 8		

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



4. Installation Instructions

1. Weld the flange supplied in the kit to the water cannon supply pipe.
2. Mount the water cannon onto the flange using bolts and nuts supplied in the kit. Stabilisers and gussets may be required to ensure that the mounting is secure and rigid. The butterfly valve should be located between the flanges of the water cannon and the mounting flange welded to supply piping. Ensure the water cannon is correctly mounted, so it CANNOT direct water at the cabin of the vehicle.
3. Activate the auto lube grease capsule located on the water cannon bearings to 12 months grease injection setting.
4. Screw the nozzle to the threaded end of the water cannon. Director nozzle is standard supply. Foam induction fog nozzle (RFIN) is available as an option.
5. Mount the joystick cabin controller box (electric) in a position that is ergonomic for operator to use.
6. Run the electrical cable 8 m supplied as standard (optional extension cable is available if required) from the cabin control box to the main control box. Cut the cable to the desired length and connect up the plugs.
7. Connect the cable from the cannon control box to the joystick box by the plug and socket supplied. Ensure all plugs are properly sealed against moisture ingress.
8. Connect the power wire as per the electric schematic.
9. Connect up the air for the butterfly valve. In the case of an on-road type truck, it is strongly suggested a hold back valve and filter pressure regulator are fitted.
10. The remote control water cannon is now ready for operations.
11. Turn on the vehicle power and air to the unit (if air butterfly fitted).
12. Check that all air fittings are correctly fitted and there are no air leaks evident (if air butterfly fitted).
13. Check all bolts are securely tightened and no water leaks are evident.
14. Now test the unit with the water pump operating and passing water through the nozzle.
15. A comprehensive parts book has been supplied for your service assistance.



5. Maintenance Schedule

Initial Service

1. The upper and lower bearings have been filled with Multi-Purpose EP Type Grease in the factory at the time of assembly. 4 pumps of grease from a grease gun should be sufficient if a new bearing has been installed.
2. Set the automatic lubrication canister supplied with the cannon to 12 months. This activates the lubricator.
3. Lubricate the rod ends (mounting for cylinders) using Multi-Purpose EP Type Grease. 1 pump of grease from a grease gun should be sufficient.
4. Check the operation of the water cannon; slew and elevation.

Quarterly Service

1. Check the condition of the swivel bearings by holding the pipe firmly and shaking it vigorously. There should be no play in the swivel bearing. Replace the seals and wear rings in the swivel bearings if there is any play.
2. Check the waster cannon for leaks. If there is a leak, it will occur at the swivel bearings. Replace the seals and wear rings in the swivel bearings if there is a leak on the water cannon.
3. Lubricate the rod ends (mounting for cylinders) using Multi-Purpose EP Type Grease. 1 pump of grease from a grease gun should be sufficient.
4. Check the automatic lubrication canister. The canister has been initially set up for 12 months. If the ambient temperature is above 40 degrees centigrade, the life of the canister may be reduced. Replace the canister if there is no sign of grease in it. Set the automatic lubrication canister to 12 months. This activates the lubricator.
5. Check the operation of the water cannon; slew and elevation.

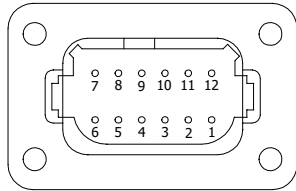
Annual Service

1. Strip and inspect the swivel bearing on the cannon. Replace the wear rings and the seals.
2. Install a new automatic lubrication canister as is indicated in quarterly service.



6. Electric Schematic / Electrical Information

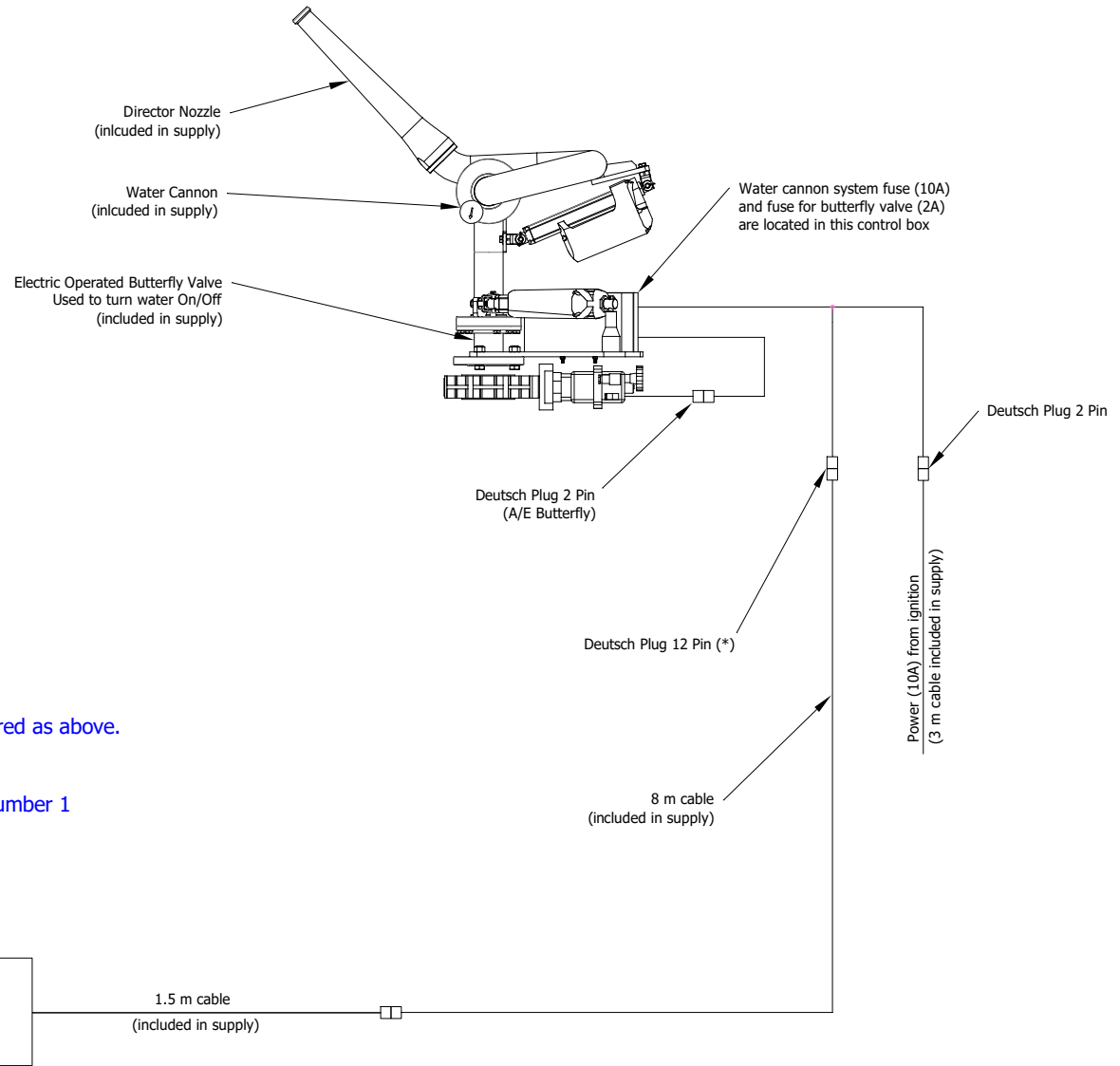
Deutsch Plug 12 Pin (*)



OUTPUTS

- Pin 1 (positive) to Butterfly Valve
- Pin 2 Cannon - Slew Left (Linak M+)
- Pin 3 Cannon - Slew Right (Linak M-)
- Pin 4 Cannon - Elevation Up (Linak M+)
- Pin 5 Cannon - Elevation Down (Linak M-)
- Pin 6 Fog (Optional)
- Pin 7 Jet (Optional)
- Pin 8 Monitor Open (Positive Signal to Butterfly Valve)
- Pin 9 Foam (-ve)
- Pin 10 Foam (+ve)
- Pin 11 Auxiliary
- Pin 12 Earth (Yellow / Green)

The water cannon is controlled through a Deutsch plug wired as above.
 Wire numbers in the cable are connected to Pin numbers in the Deutsch plug.
 Typically connection; wire number 1 is connected to Pin number 1 in the Deutsch plug.



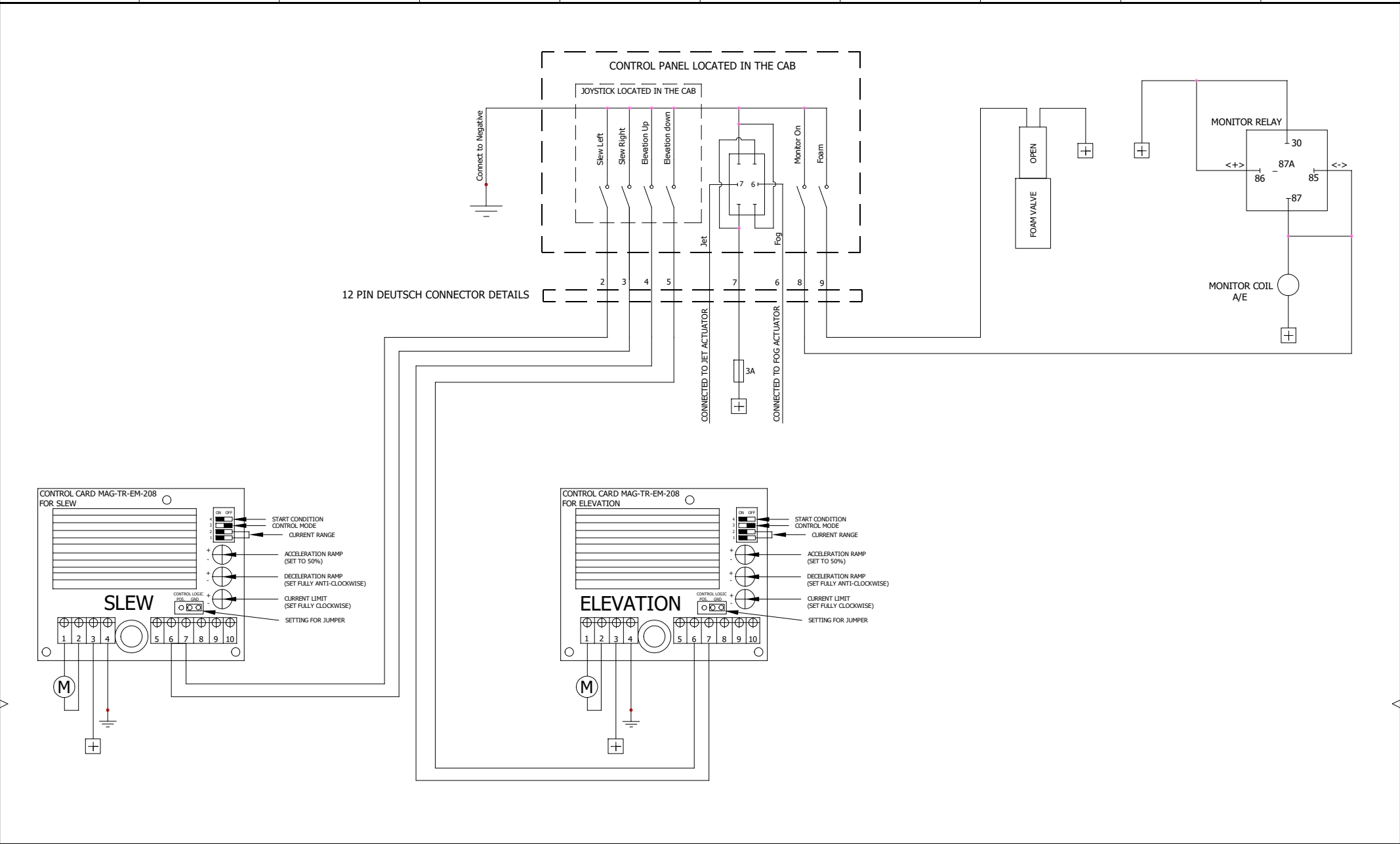
SOLIDWORKS Electrical

+	CONNECTED TO 24V DC POSITIVE THROUGH IGNITION
-	CONNECTED TO 24V DC NEGATIVE
CONTRACT:	

RM65-E	
DEUTSCH PLUG WIRING DETAILS	
A/E	
LOCATION:	+L1 Main electrical closet

REV.	DATE	NAME	CHANGES
0	10/09/2020	AlbertoC	
User data 1			User data 2

REVISION	0
SCHEME	01



CONNECTED TO 24V DC POSITIVE THROUGH IGNITION
 CONNECTED TO 24V DC NEGATIVE
 CONTRACT:

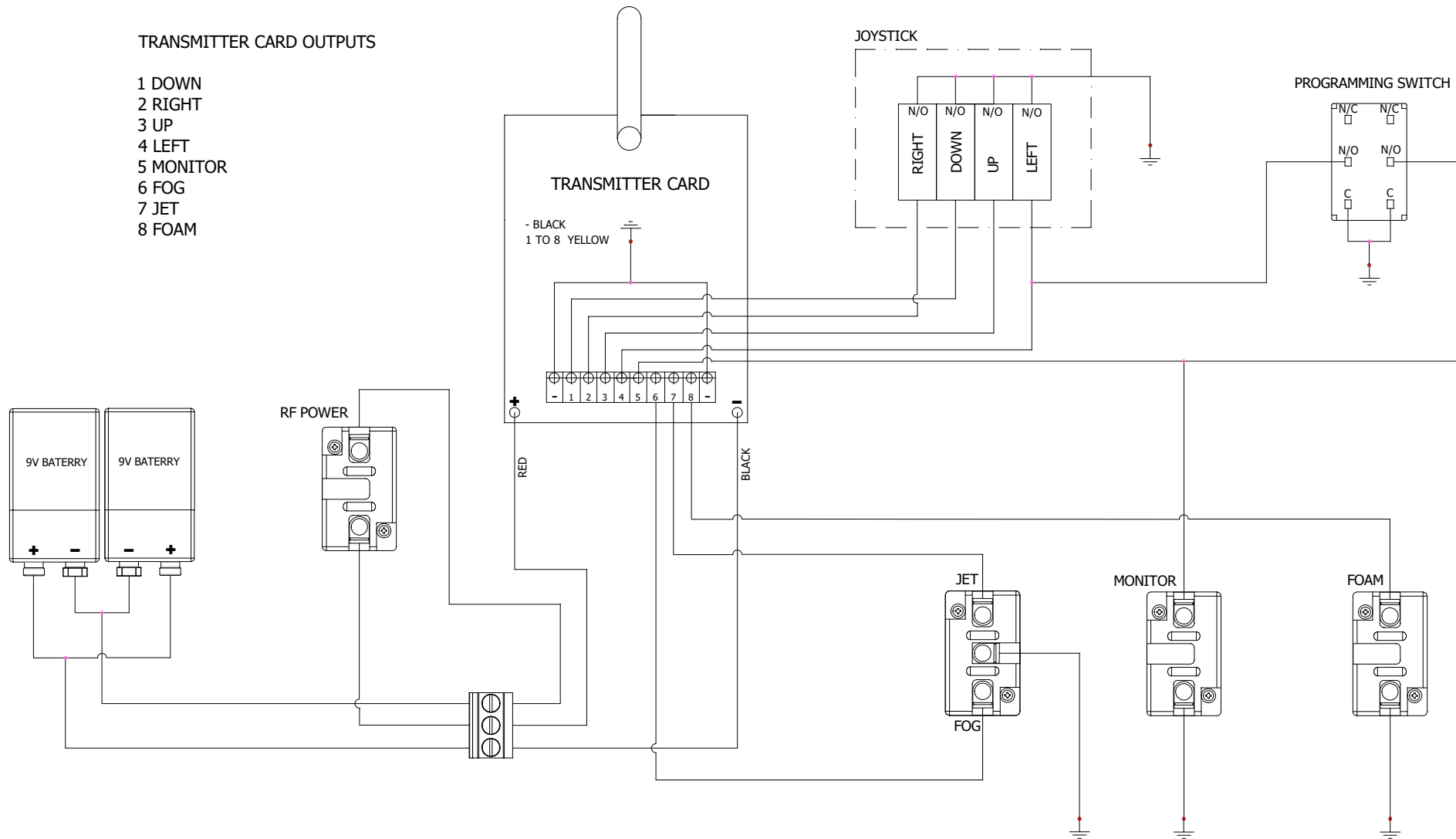
RM65-E
ELECTRICAL SCHEMATIC A/E

LOCATION: **+L1** Main electrical closet

				REVISION
				0
0	4/09/2020	AlbertoC		
REV.	DATE	NAME	CHANGES	SCHEME
User data 1			User data 2	01

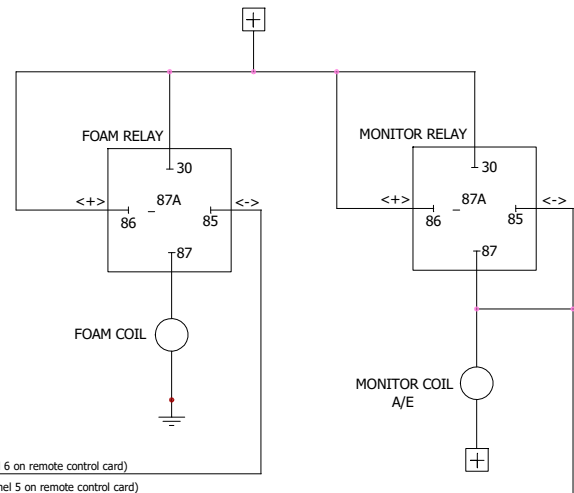
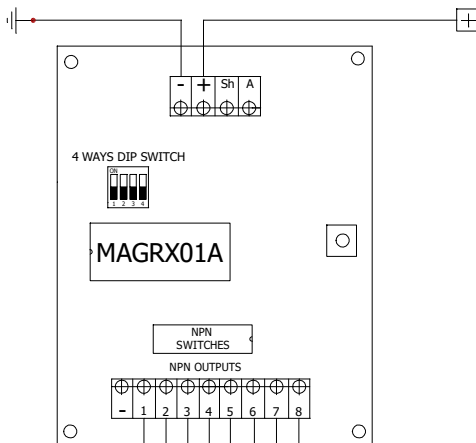
TRANSMITTER CARD OUTPUTS

- 1 DOWN
- 2 RIGHT
- 3 UP
- 4 LEFT
- 5 MONITOR
- 6 FOG
- 7 JET
- 8 FOAM

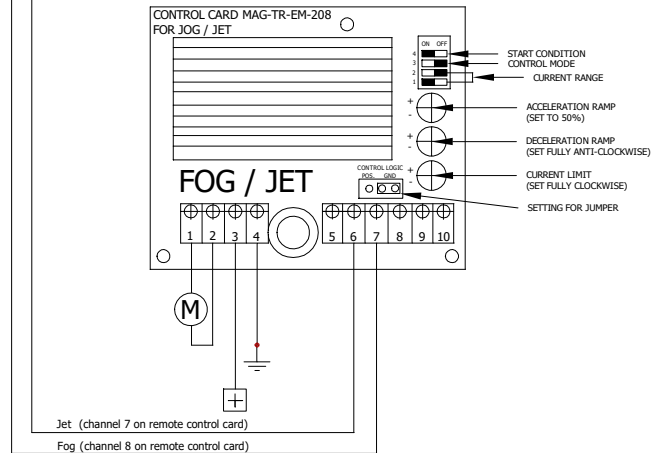
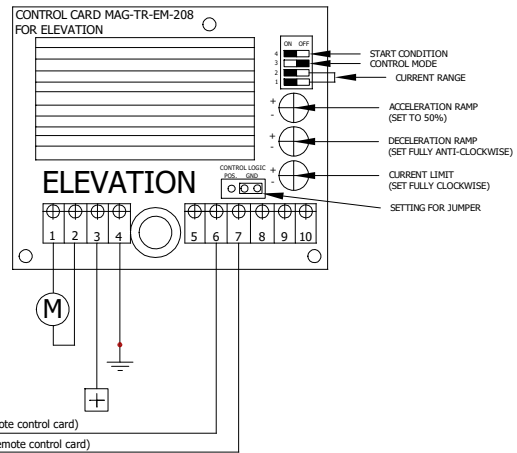
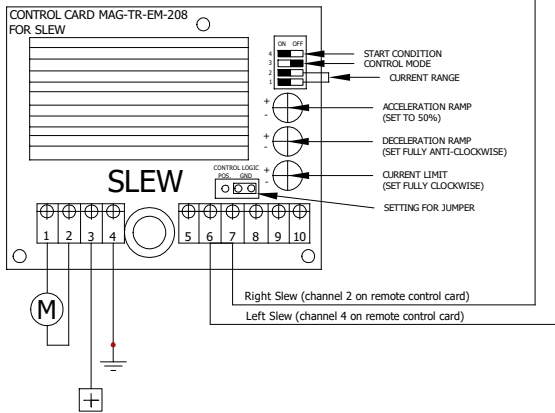


SOLIDWORKS Electrical

CONTRACT:	LOCATION: +L1	RM65-E				REVISION				
		ELECTRICAL SCHEMATIC				0				
		TRANSMITTER RF				SCHEME				
		Main electrical closet		REV. 0	DATE 15/09/2020	NAME AlbertoC	CHANGES	User data 1	User data 2	03



Foam Switch (channel 6 on remote control card)
Monitor Switch (channel 5 on remote control card)



SOLIDWORKS Electrical

CONNECTED TO 24V DC POSITIVE THROUGH IGNITION

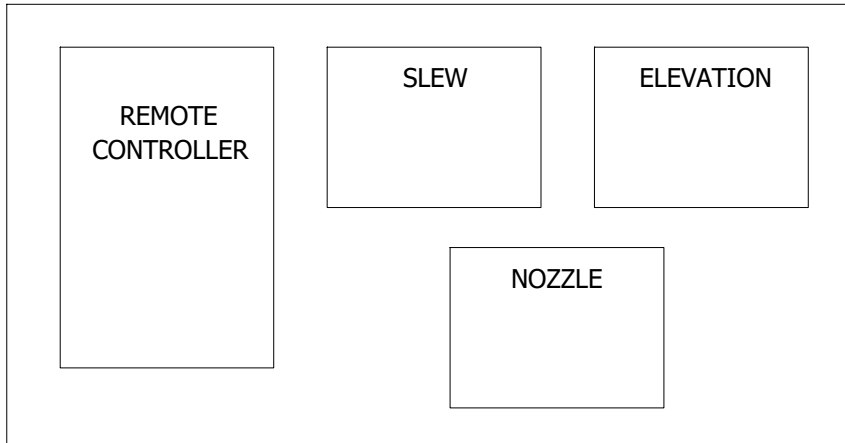
CONNECTED TO 24V DC NEGATIVE

RM65-E
ELECTRICAL SCHEMATIC A/E CONTROLLED BY RF

LOCATION: **+L1** Main electrical closet

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				0
0	4/09/2020	AlbertoC		SCHEME
REV.	DATE	NAME	CHANGES	
User data 1			User data 2	03

RM65-E CONTROL PANEL LAYOUT WITH REMOTE CONTROL



RM65-E CONTROL PANEL LAYOUT WITH NO REMOTE CONTROL



RM65-E
LAYOUT OF ELECTRICAL A/E PANEL

REVISION
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SCHEME
05

REV.	DATE	NAME	CHANGES
0	4/09/2020	AlbertoC	
User data 1			User data 2

CONTRACT: LOCATION: **+L1** Main electrical closet



7. Additional Technical Information

TR-EM-208 Starter and Current Limit for DC Motors 12-35V 1-20A

TR-EM-208 is designed specially for spindle motor use

Adjustable soft start, soft stop and current limit are main features of the card. Additionally, impulse or continuous type control can be selected as the control mode.

Control input can be set to positive or negative (gnd) logic.

Forward, reverse and stop can be set via control inputs.

Stop has highest priority and will be executed even if forward etc is on.

Restarting can be done either in both directions or only in reverse direction.

Current limit limits motor current during start to maximum 1.5 times adjusted current.

After acceleration ramp and settling time, exceeding current limit will stop motor immediately.

Current limit activation will always be indicated with error output and error led.

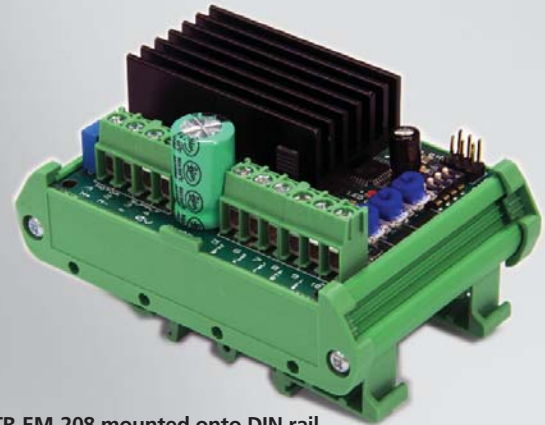
In overload situation the thermal protection will activate and switch off the control, and error output and led will start to blink.

ORDERING GUIDELINES:

TR-EM-208	PCB Only
TR-EM-208-R	PCB for DIN rail mounting
TR-EM-208-H	PCB in IP66 Enclosure
TR-EM-208-T-230	Power Supply with TR-EM-208 in enclosure



TR-EM-208 PCB Only



TR-EM-208 mounted onto DIN rail



TR-EM-208 in housing

FEATURES

- Soft start
- Soft stop
- Limit switch input (stop)
- Brake
- Adjustable current limit
- Impulse / continuous
- Pos. / gnd control logic
- Cmos / TTL / switch
- Thermal protection

Technical Data

Supply	12-35 V DC
Max. current	12A cont.20A 30% on / 70% off
Idle current	10mA typically
Current limit	Range1 1-5A (start 1.5x) Range2 5-10A (start 1.5x) Range3 10-20A (start 1.5x)
Therm. protection	120°C
Start ramp	0-3s adjustable
Free deceleration	0-3s adjustable
Operating freq.	2kHz
Voltage loss	0.6V (Im 12A)
Control inputs	"1" = 4-30Vdc, "0" = 0-1V
Error output	NPN open-coll. 30V 50mA
Oper. temp.	-10...60°C
Weight	105g

TR-EM-208 Settings and Connections

- START CONDITION switch 4**
 "ON" = after STOP command or exceeding the current limit activation start only in reverse direction
 "OFF" = after STOP command or exceeding the current limit activation start in either directions
- CONTROL MODE switch 3**
 "ON" = impulse control, start with FORWARD or REVERSE command, stop with STOP or FORWARD or REVERSE
 "OFF" = continuous drive, motor will only run as long as there is active FORWARD or REVERSE command
- CURRENT LIMIT RANGE switches 1 & 2**
 First choose coarse current range (on + on = off + off)

	1-5A		5-10A		10-20A
on off		on off		on off	
- ACCELERATION RAMP** set acceleration time 0-3s.
- DECELERATION RAMP** set free deceleration time 0-3s, before braking.
- NOTE: If D-ramp is set to 0 sec, the control commands will be executed immediately regardless of the previous command or the command under execution at the time.
- CURRENT LIMIT**
 Current limit fine adjustment.
- CONTROL LOGIC switch gnd / pos-logic**
 Select control as gnd(NPN) or positive (PNP) control. Gnd control is used in examples. If positive control is used, 5V reference output or external 4-30Vdc can be used.

New Settings will be loaded when card status is stop.

All control commands in figure (2) operate with so called positive logic (PNP-control, positive voltage commands). It is also possible to use GND controlling, in which all commands operate activate with zero voltage (NPN-control, inversely to positive control).

SPECIAL situation (Fig. 4) with thermal protection activated. When thermal protection activates ($t > 120^{\circ}\text{C}$), motor stops and error output starts to blink at 1Hz. The controller will execute new commands only when the temperature of the controller goes down to 115°C .

At this point also the error output will stop blinking. In order to execute a new command, command inputs must first be set to zero.

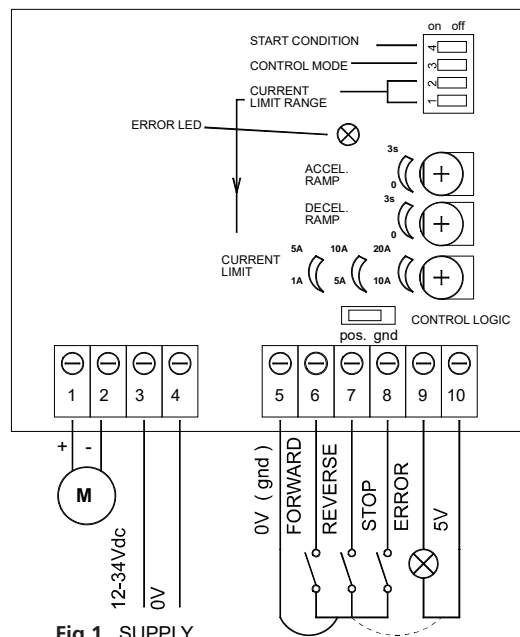
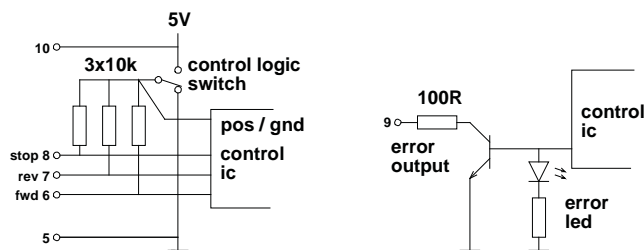
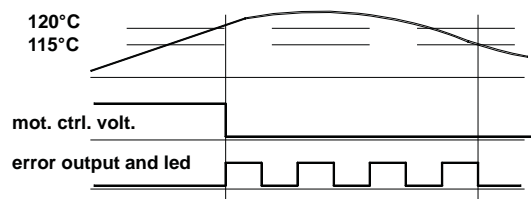


Fig 1. SUPPLY



forward, reverse and stop input
Fig 2.

error output and led
Fig 3.



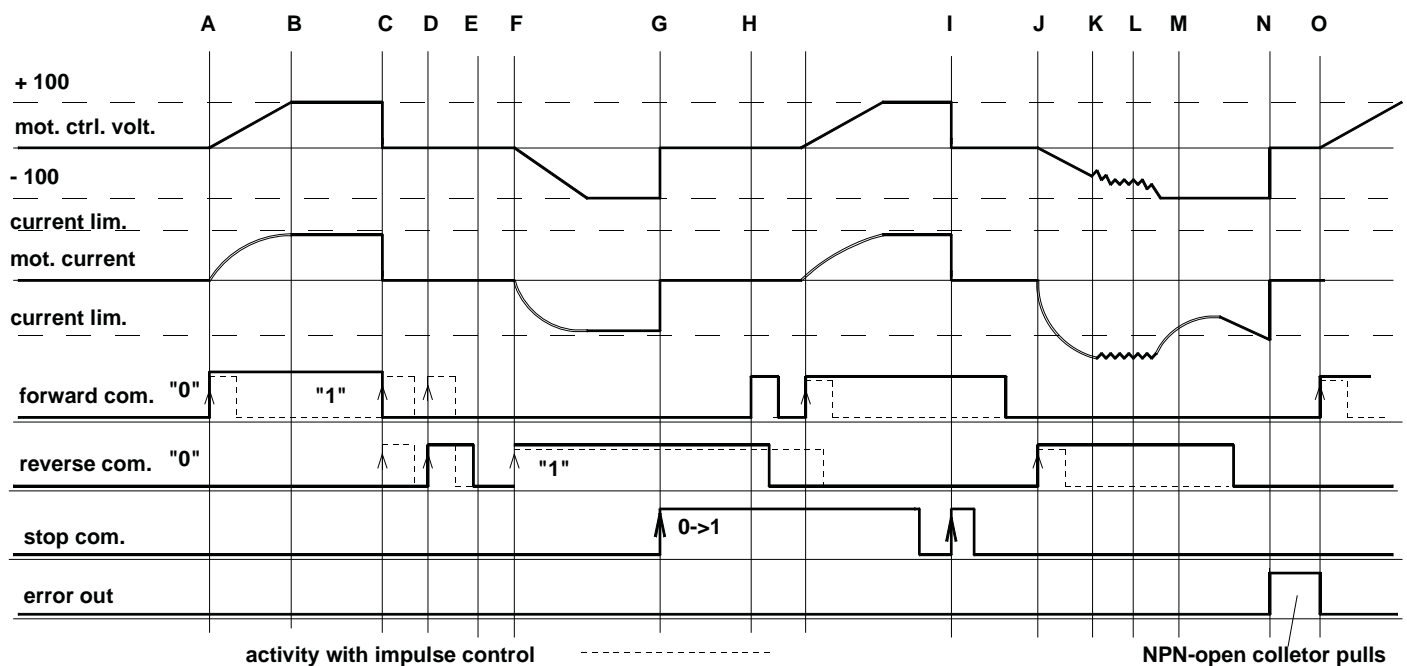
thermal protection
Fig 4.

TR-EM-208 Timing Chart

- A: Normal start with forward command. Motor voltage will rise along accel. ramp, ramp time A->B adjustable 0-3s.
- C: Command aborted, motor voltage drops, motor runs freely during free deceleration C->E, time adjustable 0-3s.
New commands (D) won't affect the operation. After free deceleration, the controller will switch to braking at point E, in other words motor poles will be short circuited (braking).
With impulse control either "new" command will stop. During C->E new impulses will not activate a start.
- F: Start with reverse command.
- G: Stop input changes 0->1 and stops the motor. Motor will remain in this condition until a new command is assigned.
- Start condition setting applies to this moment, restart can be activated in both directions or only in reverse direction.
- H: New start attempt, if old command is still on, new command will not be executed. When old command exits, new command must first be set to zero before it will be executed.
Notice that new stop command will activate only after stop is first set to zero, in other words changed 0->1 at point I.
- J: Start, in which motor will exceed current limit already during acceleration ramp J->L, at point K current is 1.5 times adjusted current.
Controller starts to limit motor current by limiting control voltage.
- L: Settling time L->M (constant 0.5s), motor current is still being limited. During this time, if motor current will not decrease to current limit range, the controller will switch off motor voltage.
- N: If motor current exceeds set limit after acceleration and settling time, control will be switched off as in point N. Motor will be stopped and error output and led will be activated.
- O: After over current switch off, restart is possible either in both directions or with only reverse control, see start conditions on first page.
Restart resets error output and led.

! Activity with continuous control mode is illustrated with solid line.

! Activity with impulse control mode is illustrated with dashed line.





Control Card Function

It is possible to run the cannon with switches and relays only. The protection provided by the electronic control card makes the electric driven water cannon more reliable for our customer. It is not possible to burn the actuator out if it is operated at the level and it is sufficient for the application. The functions of the electronic control card used on the RM65 – E are as follows:

1. It limits the current that can be applied to the actuator; the result of this is it limits the force applied to moving the water cannon. The 24 Volt DC system is limited to 5 amps (Full load current for the 24 Volt DC actuator is 10.3 amps). The 12 Volt DC system is limited to 13 amps (Full load current for the 12 Volt DC actuator is 20.7 amps). In the event that the cannon becomes tighter. Perhaps because the bearing is not being lubricated, the current limiting function will protect the cannon structure and the actuator by stalling the cannon.
2. Turning an electrical motor in one direction and then rapidly commanding it to move in the opposite direction will result in very high surge currents. This will heat the motor, the current will blow fuses and the life of the actuator will be considerably reduced. The electronic control cards controls the level of the surge and slows the change to a level that the current will not rise above the preset value.

Control Card Fault Indication

The actuator control card has an LED on it that is used to indicate a fault with the system. Faults indicated on the actuator control card are current overload (indicated by the LED staying on continuously) and overheating of the actuator (indicated by the LED flashing on and off). The LED indicator will be reset when the fault is removed and the actuator is operated again or if the power to the control box is turned off.

Method of Fault Finding the Electrical Control System.

Check the drawing on the next page and ensure the dip switches on the electronic control card have been set correctly. It should be noted that the card is capable of operating from 12 to 34 Volts DC, so the dip switches need to be set up for either 12 volt or 24 volt. Check the dip switch labelled control logic on the control card, the switch should be set to the GND position. Please contact Magnum Australia if the dip switch is not in the GND position.

1. Check if the electric actuator is OK.

This can be done by removing the wires that are in terminal (1) and (2) of the electronic control card. Mark the wires with the purpose of putting them back in the same place. Connect the wire that was in (1) directly to the positive of the battery and the wire that was in (2) directly into the negative. Do the reverse process by connecting the wire that was in (1) directly to the negative of the battery and the wire that was in (2) directly to the positive.

If the actuator moves in any one of the above, it means the actuator is OK and this is not the problem. If there is not movement from either test, the actuator is faulty and needs to be replaced. If the actuator is OK, connect it up back to the electronic card. Look at the notes above, the actuator is operating at less than half current, and it is highly unlikely that the linear actuator will damage.

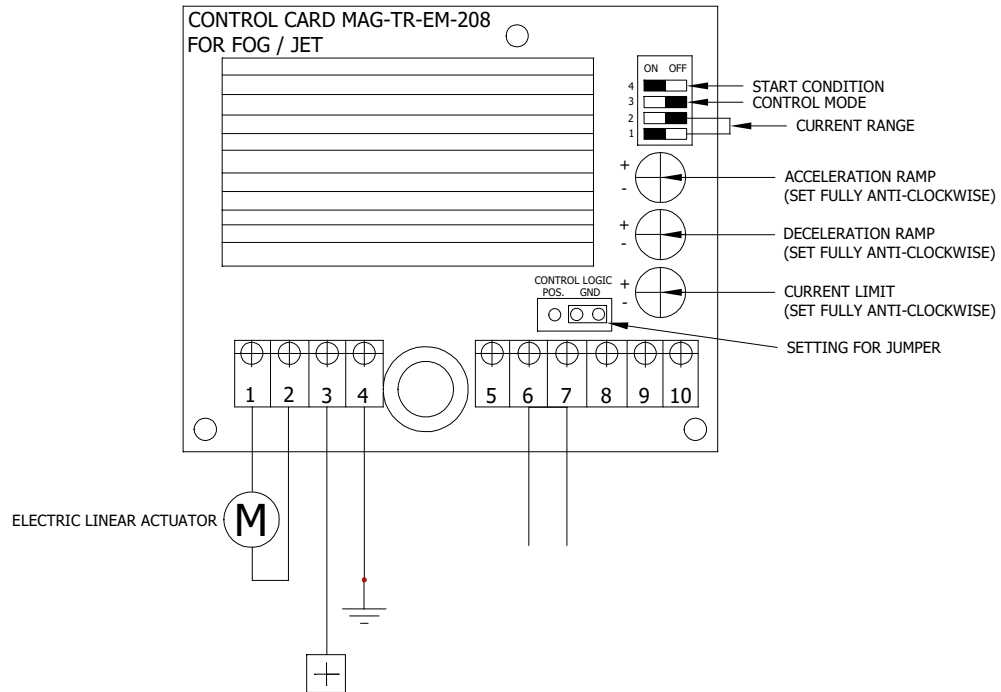
2. If the actuator is OK you need to check the electronic board.

Step 1, check that there is power on the board using a voltmeter. Place the test points of the voltmeter on terminals (3) and (4). If the voltmeter measures 12V or 24V that is used to power the system, go to step 2. In case of not getting any reading, check the fuse and the power to the cannon.

Step 2, take a piece of wire and connect it to a good earth. Touching terminal (6), the cannon should move in one direction. Touch terminal (7), the cannon should move in the opposite direction. If the cannon moves, it means that the card is OK and the problem is with the joystick.

Replace the joystick and try again. If there is not movement when touching terminals (6) or (7), the problem is with the card. Replace the electronic control card and try again.

CONTROL CARD SETTINGS FOR FOG / JET NOZZLE ACTUATOR
12V OR 24V DC SETTINGS
5 - 10A DIP SWITCH 1 - ON & DIP SWITCH 2 - OFF



CONNECTED TO 12V - 34V DC POSITIVE THROUGH IGNITION

CONNECTED TO 24V DC NEGATIVE

RM65-E
CONTROL CARD SETTINGS RM65-E
FOG AND JET

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REV.	DATE	NAME	CHANGES	07
User data 1			User data 2	

CONTRACT:

LOCATION:

+L1

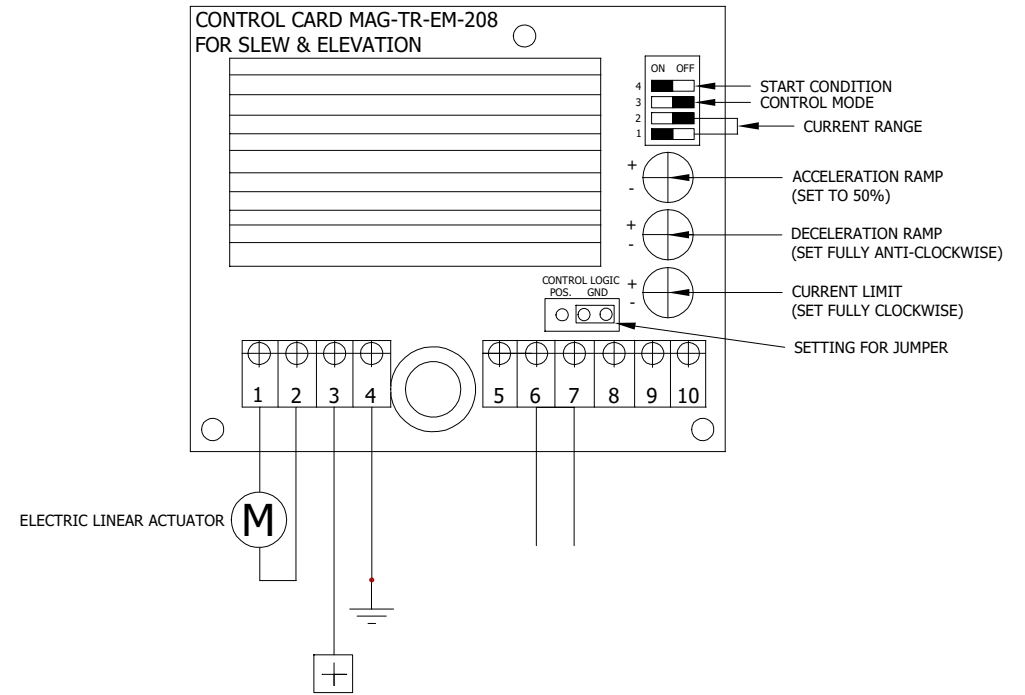
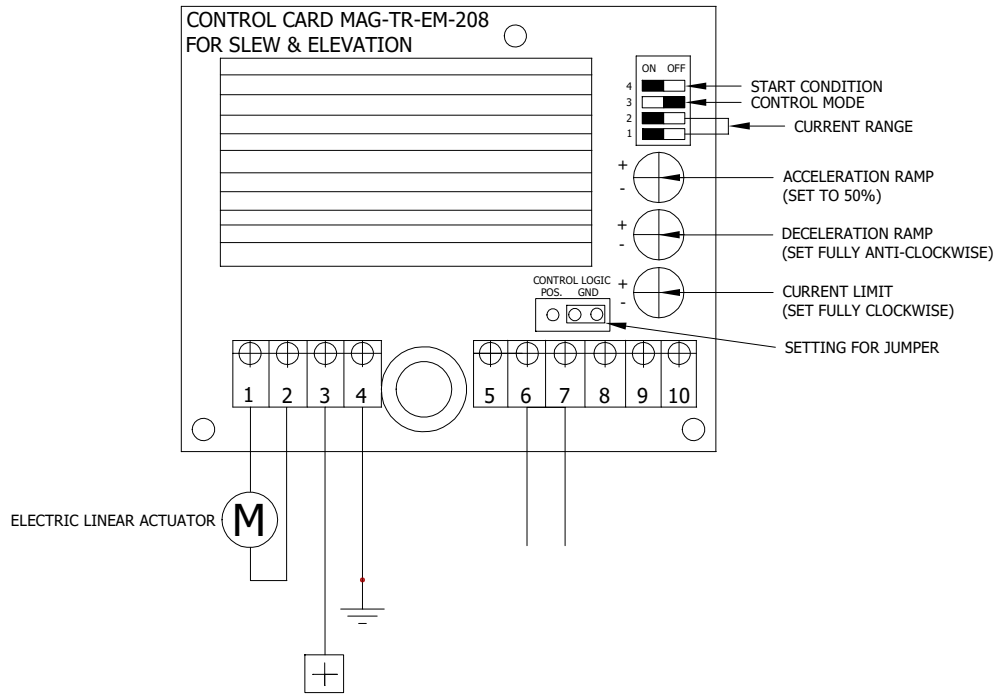
Main electrical closet

CONTROL CARD SETTINGS FOR SLEW & ELEVATION ACTUATORS
24V DC SETTINGS

1 - 5A DIP SWITCH 1 - ON & DIP SWITCH 2 - ON

CONTROL CARD SETTINGS FOR SLEW & ELEVATION ACTUATORS
12V DC SETTINGS

5 - 10A DIP SWITCH 1 - ON & DIP SWITCH 2 - OFF



CONNECTED TO 12V - 34V DC POSITIVE THROUGH IGNITION
 CONNECTED TO 24V DC NEGATIVE

RM65-E
CONTROL CARD SETTINGS RM65-E
SLEW AND ELEVATION

CONTRACT: LOCATION: **+L1** Main electrical closet

REV.	DATE	NAME	CHANGES
0	4/09/2020	AlbertoC	
User data 1			User data 2

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SCHEME
06

ACTUATOR LA36

Features:

- 12, 24 or 36 V DC Permanent magnetic motor with resettable thermal overload protection
- Thrust from 500 N - 10.000 N depending on gear ratio and spindle pitch
- 10.000 N actuator cannot be ordered without electrical endstop
- 10.000 N actuator can be ordered in push now and pull from 01-09-207
- Max. speed up to 160 mm/sec. depending on load and spindle pitch
- Heavy duty aluminium housing for harsh conditions
- Highly efficient acme thread spindle
- Protection class: IP66 for outdoor use (dynamic), furthermore the actuator can be washed down by a high pressure cleaner (IP69K - static)
- Hand crank for manual operation
- Mechanical overload protection through integrated slip clutch (adjusted to 1.2 - 1.5 times max. load)
- Integrated brake, high self-lock ability
- End play – 2 mm max.
- Non rotating piston rod eye (turnable 0-90 degrees)
- Back fixture turnable in steps of 30 degrees

Options:

- Built in end stop switches
- Adjustable magnetic sensors for end stop signals (code no. 1017031)
- Hall effect sensor with AIB –signal
- Potentiometer full scale at 333 mm stroke with 8 mm pitch, 500 mm stroke with 12 mm pitch and 833 mm with 20 mm pitch
- Different back fixtures and piston rod eyes
- Exchangeable cables in different lengths

Usage:

- Duty cycle at max. load 20% (up to 600 mm stroke, for strokes between 601-999 mm the max. duty cycle is 15%) at ambient temperature 25°C
- Ambient operating temperature -30°C to +65°C full performance from 5 - 40°C



TECHLINE™
IMPROVING FLEXIBILITY

LA36 is ideal for use in harsh conditions. It is our most solid actuator based on the philosophy that it must be able to operate under extreme conditions. The actuator is ideal for mobile "off-highway" equipment such as agricultural, forestry and construction machines.



Date: 16 November 2020

Revision:

Created: Alberto Ceron (Engineer)

Checked: Rocky Di Battista (Operations Manager)

Approved: Sean Haviland (Director)