OPERATOR'S MANUAL

Metal Working

Book 2 of 2

HYDRAULIC SHEAR
MODEL: SH-70250-HD

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LUBRICATION AND MAINTENANCE

WARNING: Make sure the electrical disconnect is OFF before working on the machine.
Maintenance should be performed on a regular basis by qualified personnel.
Always follow proper safety precautions when working on or around any machinery.

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- On a weekly basis clean the machine and the area around it.
- Lubricate threaded components and sliding devices.
- Apply rust inhibitive lubricant to all non-painted surfaces.

***Note**: Proper maintenance can increase the life expectancy of your machine.*

Machine Lubrication

The main lubricating positions of machine:

Cutting Beam roller bearings	Calcium-based grease	2000 hours
Rolling surface of rollers and guides	Calcium-based grease	40-50 hours
Lead screws, chain and guiding groves	Calcium-based grease	40-50 hours
Exposed wear surfaces and bare metal parts	Calcium-based grease	40-50 hours

Blade Changing and Grinding

It is very important to grind the blade edges regularly. Long time use of blade, with no grinding, will increase the cost of grinding, and shorted the blade life as a whole. Continuous shearing with blunt cutting edges, will cause the outer crystal grains of the blade to be damaged under the excessive pressure.
Through the grinding of cutting edges, the outer layer of the damaged crystal grains can be removed. For this, a schedule for blade edges grinding should be made based upon actual production material and schedule.
The following schedule for cutting edge grounding is recommended:

- Cutting edge change after 80-100 working hours for blade;
- Cutting edge grounding after 320-400 working hours for blade. There are 4 cutting edges for the each of blades equipped on the machine.

- The schedule recommended above is only to be used for the shears put into normal operation. If the cutting edges of blade are arranged for grinding following the schedule, the removal quantity of blade would be minimum, and its lifetime be maximum possible.
- After the edge grinding or replacement of blade, the blade clearance has to be re-inspected and readjusted.

Hydraulic System

- Inspect the oil level of tank regularly. If the oil is below the mid-line of oil level, replenish the tank immediately.
- The first oil change has to be made after 500 working hours. Afterwards oil change is to be made regularly whenever the machine has worked for 2000 hours.
- Clean the oil suction filter after the first 40 hours of operation and then follow the hydraulic oil changing schedule.
- Clean the hydraulic breather cap after the first 40 hours of operation and then follow the hydraulic oil changing schedule.
- It is recommended not to work below 23°F (-5°C) or above 167°F (75°C). In cases where the temperature is very low, running the system at idle for several minutes will warm the oil. If needed, install a heater in the hydraulic system to warm the oil, or a cooler if the temperature is too high.

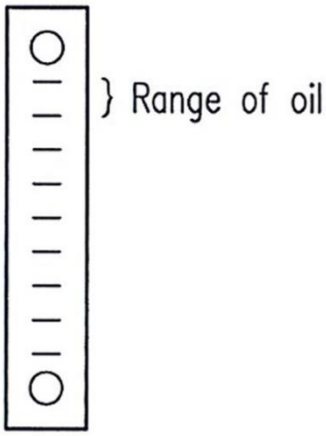
Changing Hydraulic Oil

The hydraulic oil is the primary medium for transmitting pressure and also must lubricate the running parts of the pump.
Cleaning of the oil tank is very important. Proper hydraulic operation depends upon clean hydraulic oil and a clean hydraulic system.

***Important**: Used oil products must be disposed of in a proper manner following your local regulations.*

1. Remove the center (and right if desired) front cover to access the reservoir.
2. Have a container capable of holding at least 30 gal. (114L) available to drain the tank into.
3. Using the drain plug at the front of the tank or a siphon pump through the top of the tank, empty the tank into the container and recycle according to local standards.

4. Remove the top cover and clean the hydraulic tank and re-install the top cover.
5. Use hydraulic oil #68 SHELL BRAND or an equivalent with similar specifications to fill the hydraulic tank until it reaches the midpoint on the sight gauge.
6. Keep hydraulic reservoir filled to 90% of capacity.
7. DO NOT rely totally on the oil gauge as they can sometimes indicate an incorrect level reading. Do a visual inspection with the oil fill cap removed as well.
8. A shortage of hydraulic oil will cause hydraulic system breakdown to major mechanical components due to overheating.
9. Change the hydraulic oil and clean the suction filter after the first 500 hours of operation. Thereafter the hydraulic oil and filter should be changed at 2000 hours or annually.



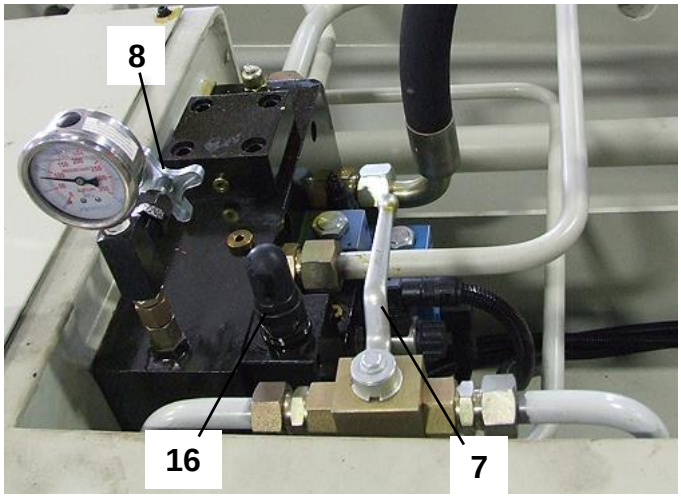
Oil gauge

Hydraulic Pressure Filling the Accumulator

NOTICE: *This is not a common function. The accumulator has been charged from the factory and will not require charging unless someone has tempered with or inadvertently actuated the accumulator hydraulic circuit ball valve. The accumulator will only require hydraulic pressure filling if the hydraulic pressure gauge is below 8MPa AND the shearing ram will not lift and hold at the full up position.*

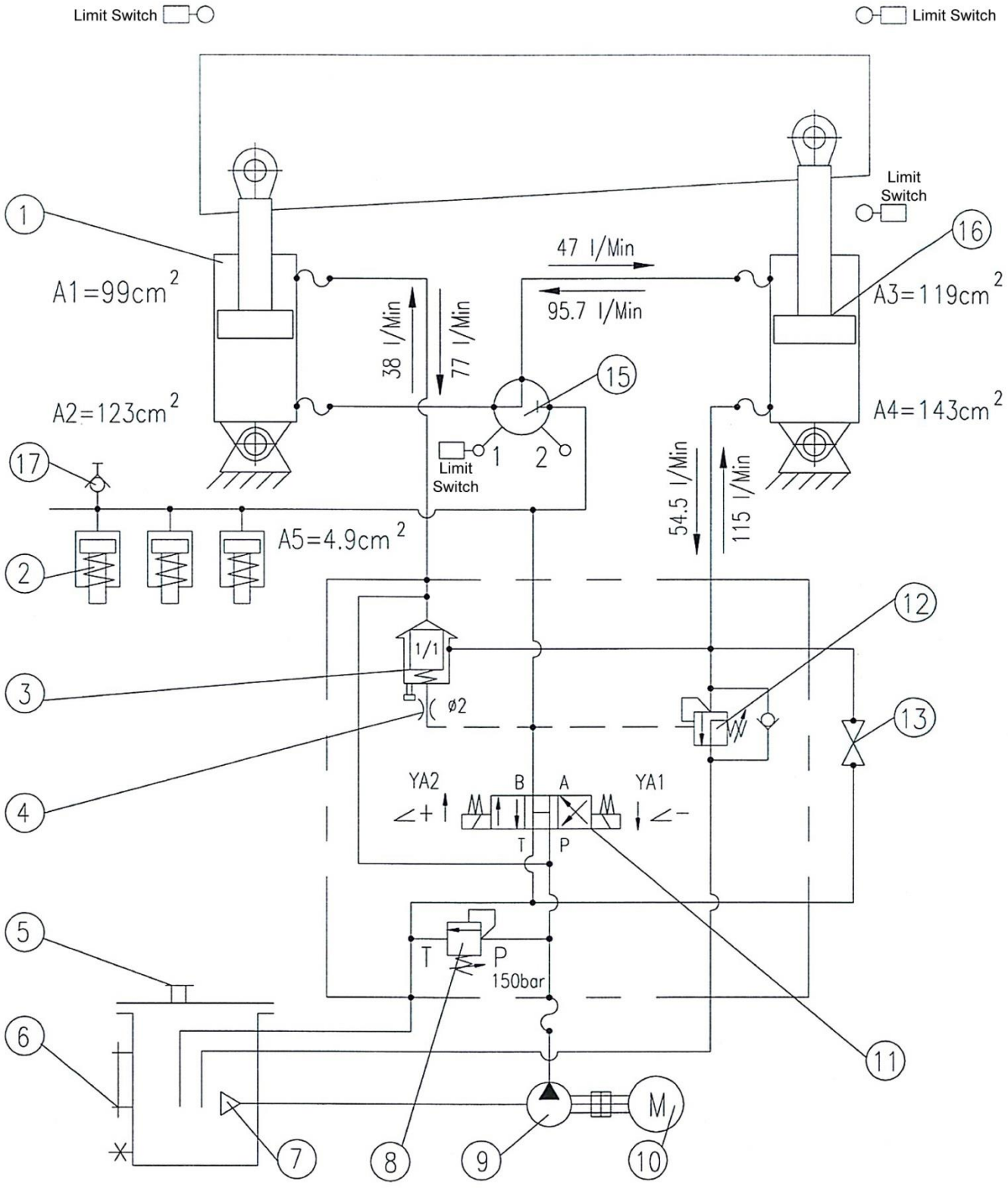
Note: *This operation requires two people to be able to reach switches and valve at the same time.*

1. Open the shutoff needle valve #8 to allow pressure to the pressure gauge.
2. IF THE SHEARING RAM IS NOT ALL THE WAY AT THE BOTTOM OF ITS TRAVEL, OPENING THE BALL VAVLE #7 WILL CAUSE THE RAM TO FALL. Open the shutoff ball valve #7 slowly allowing the ram to lower to the bottom position.
3. Start the pump and place the stroke key switch in the left jog stroke position.
4. Place the accumulator switch in the right “1” position. This will energize the YA1 and YA2 valve.



5. Adjust the relief valve #16, until the oil pressure of accumulator is at 11MPa, this is the P2 value as shown on the hydraulic diagram.
6. Close the shutoff ball valve #7. Then turn the accumulator switch to the “0” position. The cutting beam will raise by the pressurized oil from the accumulator.
7. Close the shutoff needle valve #8. This will prevent the pressure gauge from feeling any pressure spikes during normal operation.

HYDRAULIC SCHEMATIC



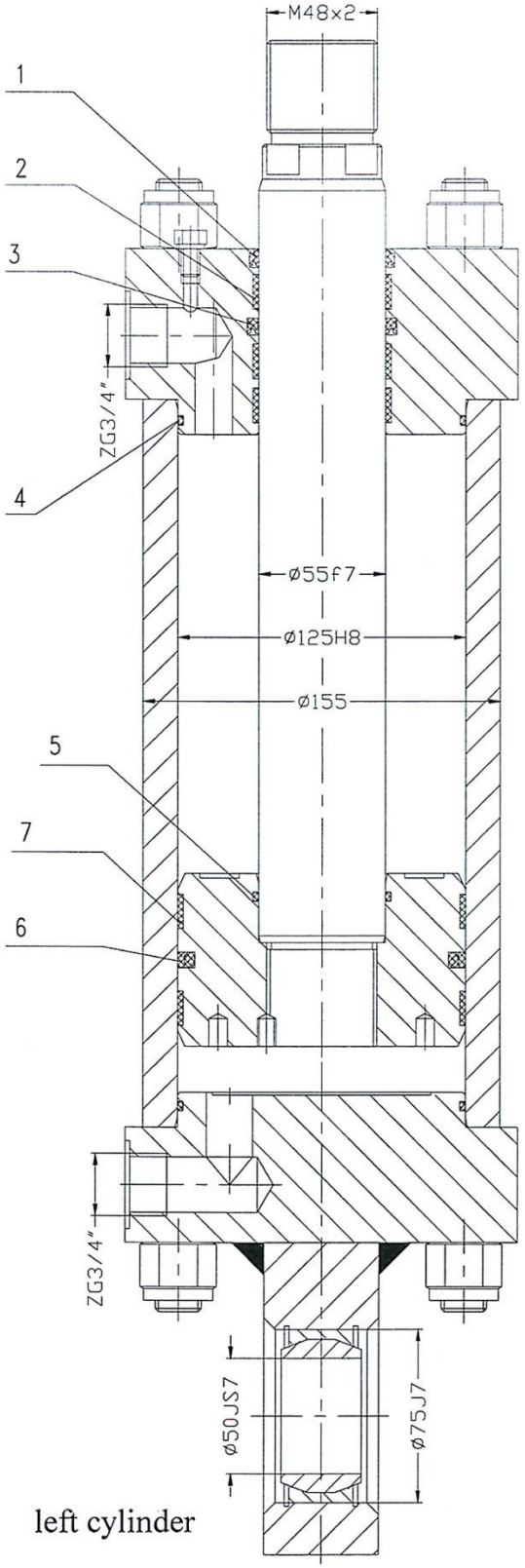
Hydraulic Parts List

Item	Code	Name	Qty.	Remarks
1		Left Cylinder	1	
2		Clamping Cylinder	17	
3		Two Way Valve	1	
4		Throttle Valve	1	
5	QUQ2-20x1.0	Air Filter	1	
6	TS-5	Fluid Level	1	
7	WF-12x100	Oil Filter	1	
8	DGMC-5-PT-GW-41	Pressure Valve	1	VICKERS
9	DVQ25-22FRAR-02	Oil Pump	1	KCL
10	Y132M-4	Motor 7.5kW	1	B35
11	4WE10H73-3X/EG24N9K4A12	Solenoid Valve	1	REXROTH
12	SO5A-R3/I4	Balance Valve	1	
13	GCT-02	Braking Valve	1	
15	KH3-G3/4-1112-01X	Change-over Valve	1	
16		Right Cylinder	1	
17	D1-3/G1/4	Pressure joint	1	

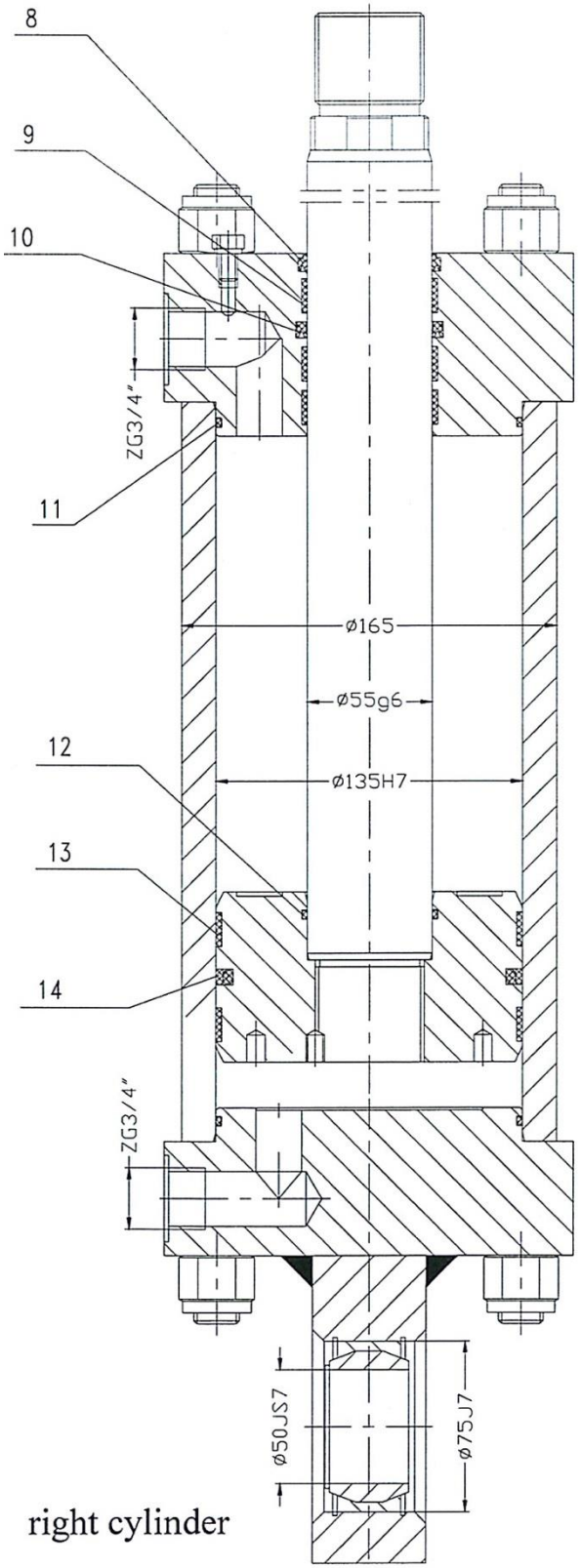
List of Hydraulic Wear Parts

No.	Name	Specification	Qty.	Position	Remarks
1	Dustproof Seal	DH (LBI) 55x63x5x6.3	1	Left Cylinder	NOK
2	Guide Seal	RYT15x2.5x173	3	Left Cylinder	NOK
3	Rod Seal	T605-4615600	1	Left Cylinder	HALLITE
4	"O"-Ring	G120	2	Left Cylinder	
5	"O"-Ring	G55	1	Left Cylinder	
6	Piston Seal	GSP 125x110x6.6	1	Left Cylinder	REDUX
7	Guide Seal	RYT 15x2.5x393	2	Left Cylinder	NOK
8	Dustproof Seal	DH (LBI) 55x63x5x6.3	1	Right Cylinder	NOK
9	Guide Seal	RYT 15x2.5x173	3	Right Cylinder	NOK
10	Rod Seal	T605-4615600	1	Right Cylinder	HALLITE
11	"O"-Ring	G130	2	Right Cylinder	
12	"O"-Ring	G55	1	Right Cylinder	
13	Guide Seal	RYT 15x2.5x424	2	Right Cylinder	NOK
14	Piston Seal	GSP 135x120x6.6	1	Right Cylinder	REDUX
15	"O"-Ring	P40	17	Clamping Cylinder	
16	Rod Seal	USH 22x28x5	17	Clamping Cylinder	NOK
17	Guide Seal	RYT 8x2x78	34	Clamping Cylinder	NOK
18	Ring	BRT 3-22x28x2	17	Clamping Cylinder	NOK

LEFT HYDRAULIC CYLINDER DIAGRAM

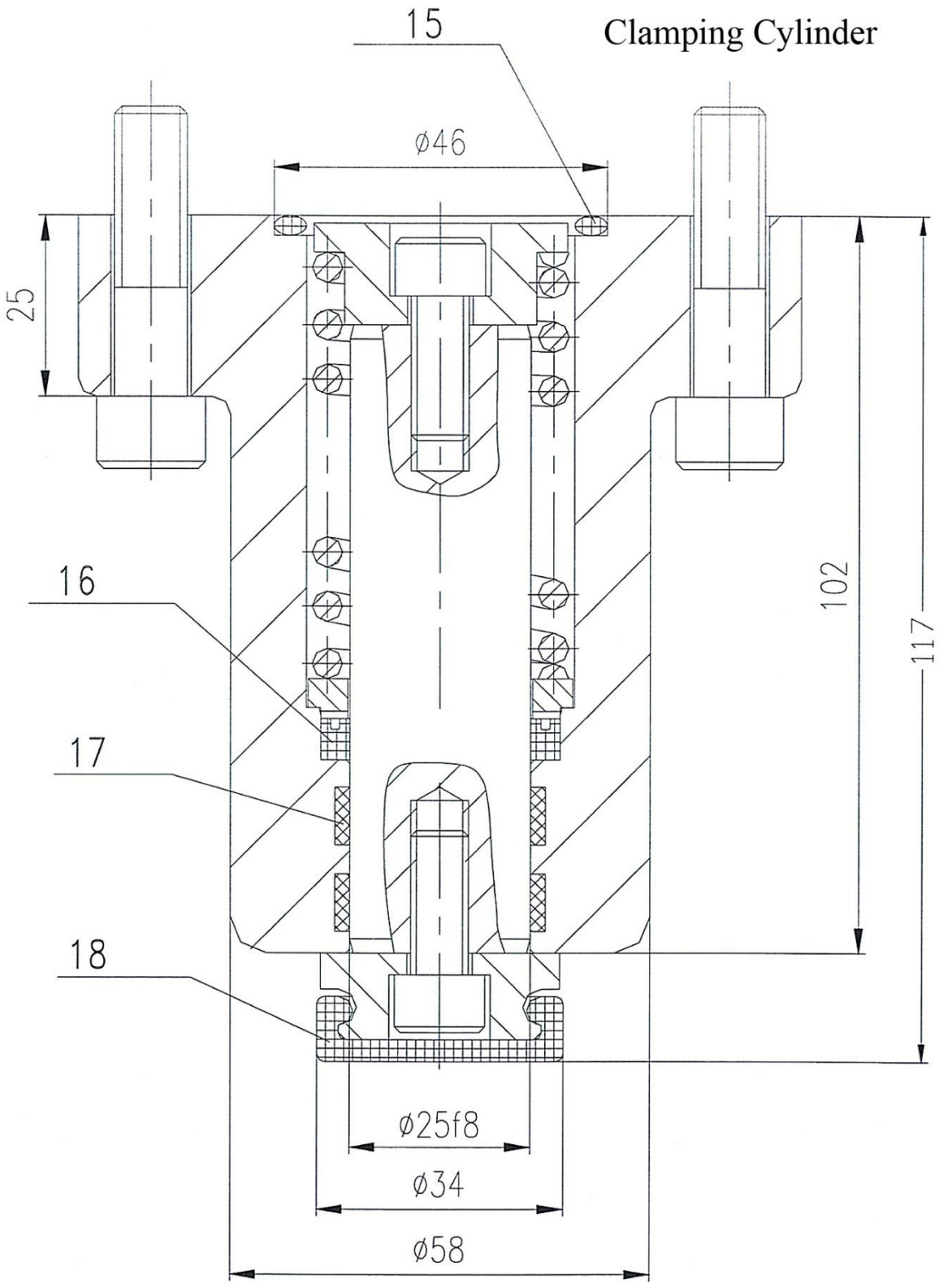


RIGHT HYDRAULIC CYLINDER DIAGRAM

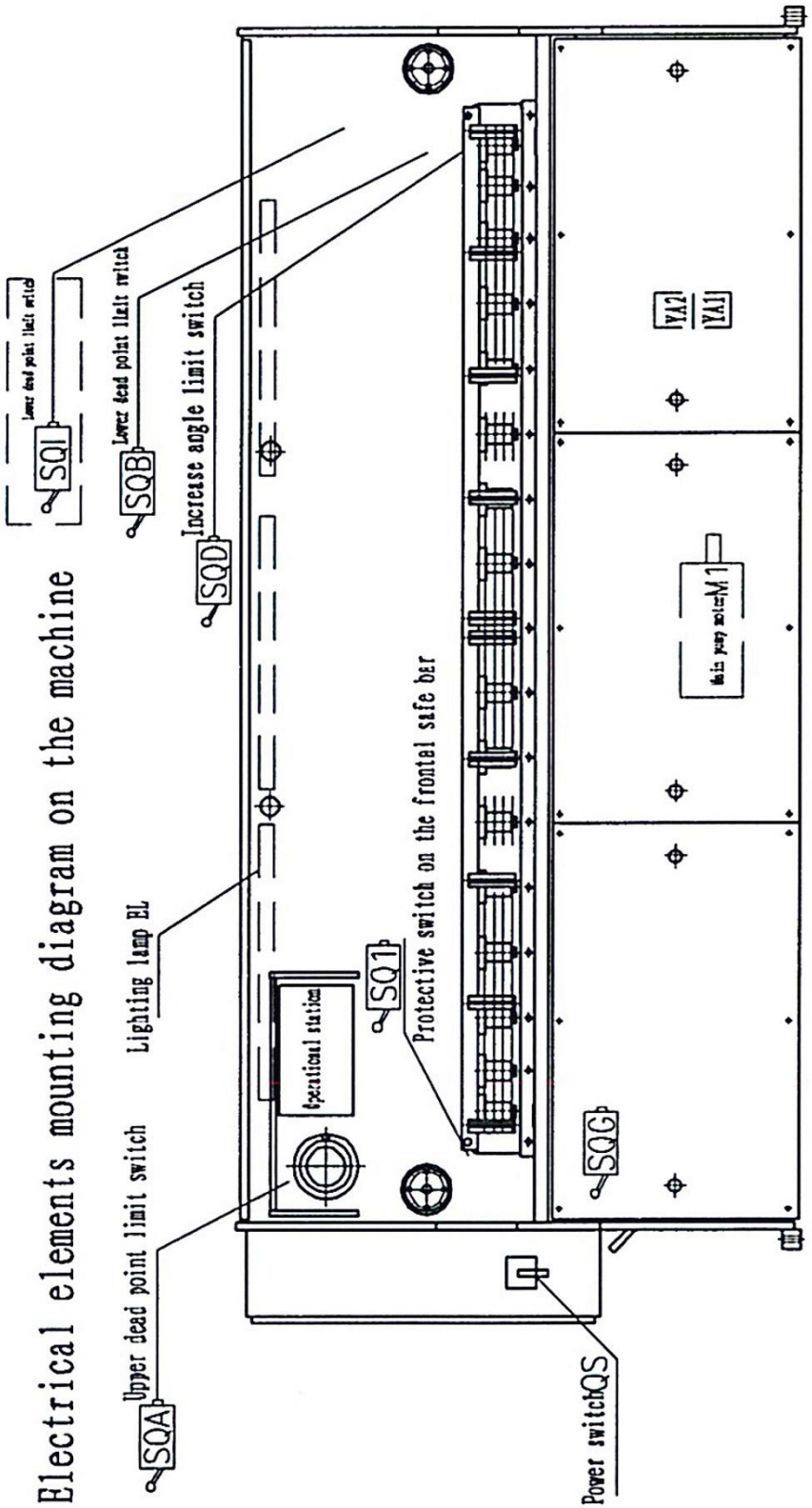


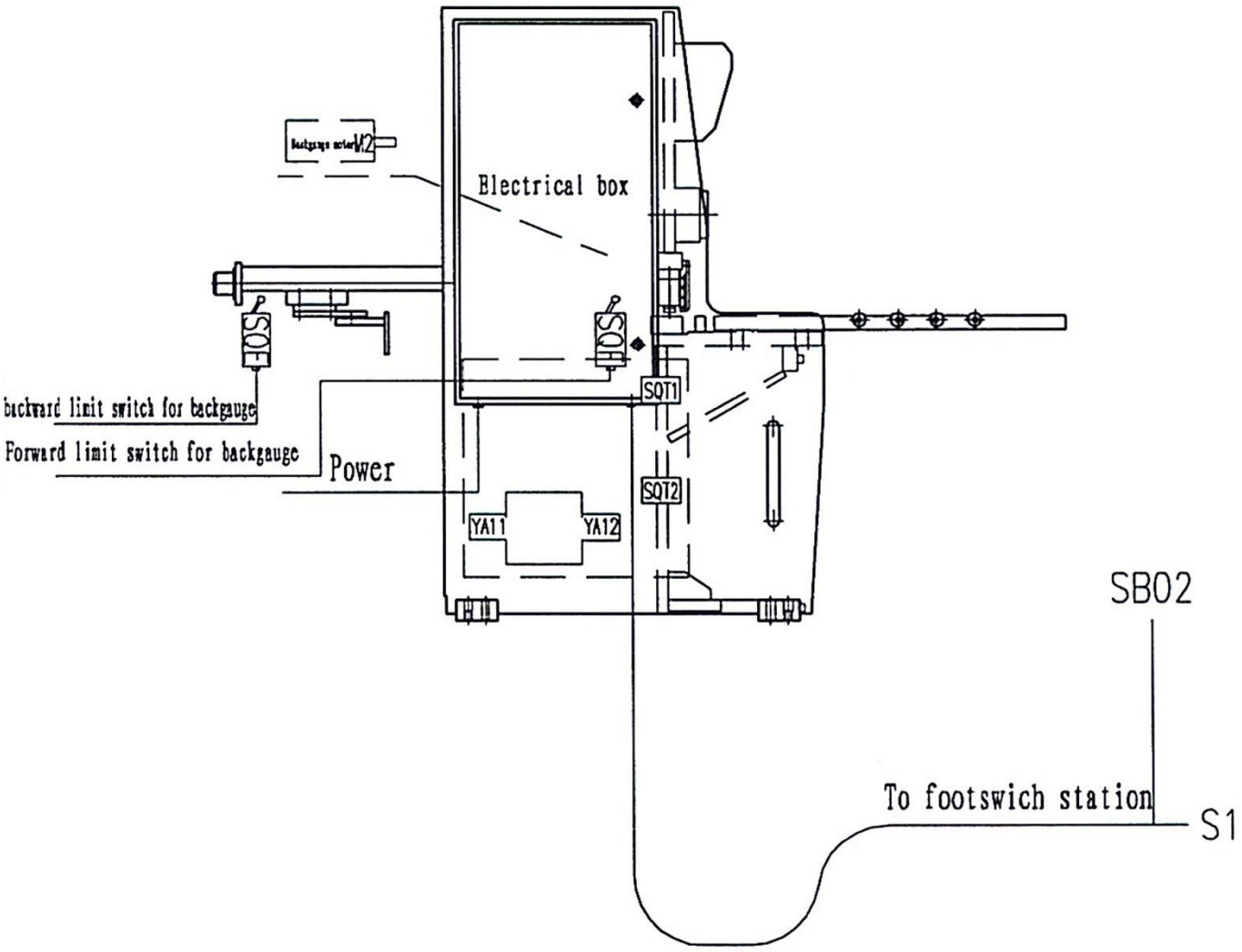
right cylinder

CLAMPING HYDRAULIC CYLINDER DIAGRAM

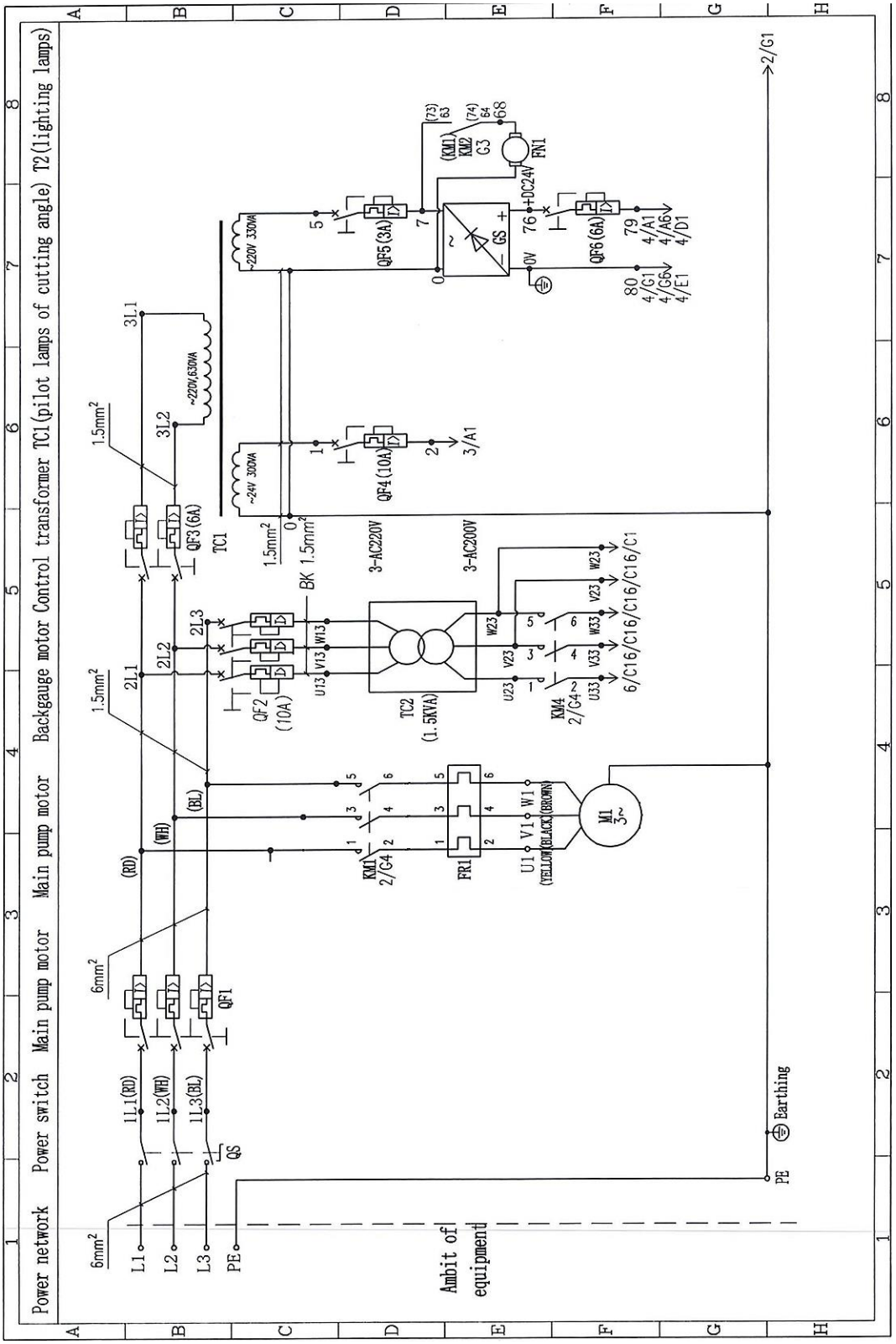


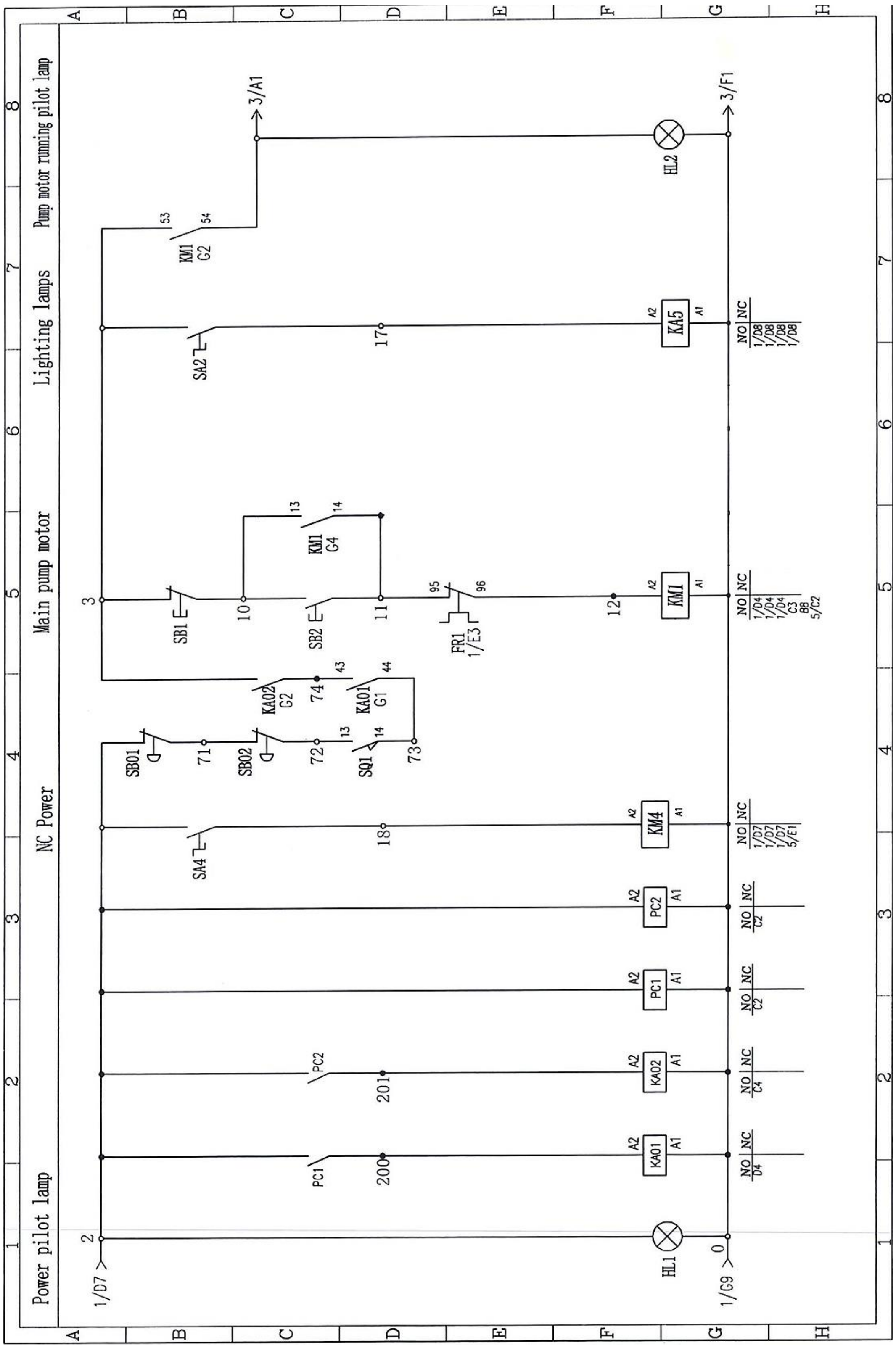
ELECTRICAL COMPONENT LOCATIONS

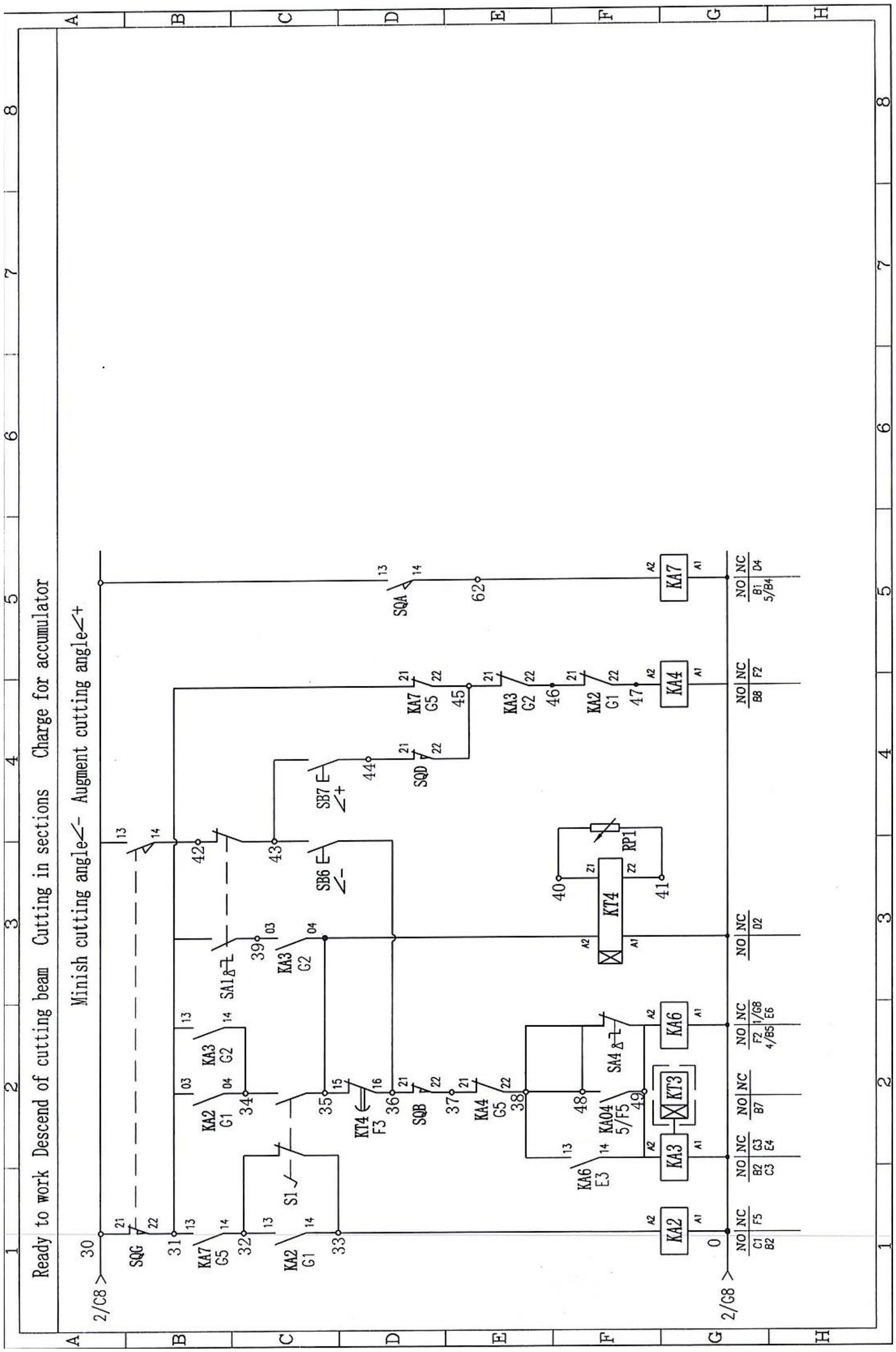


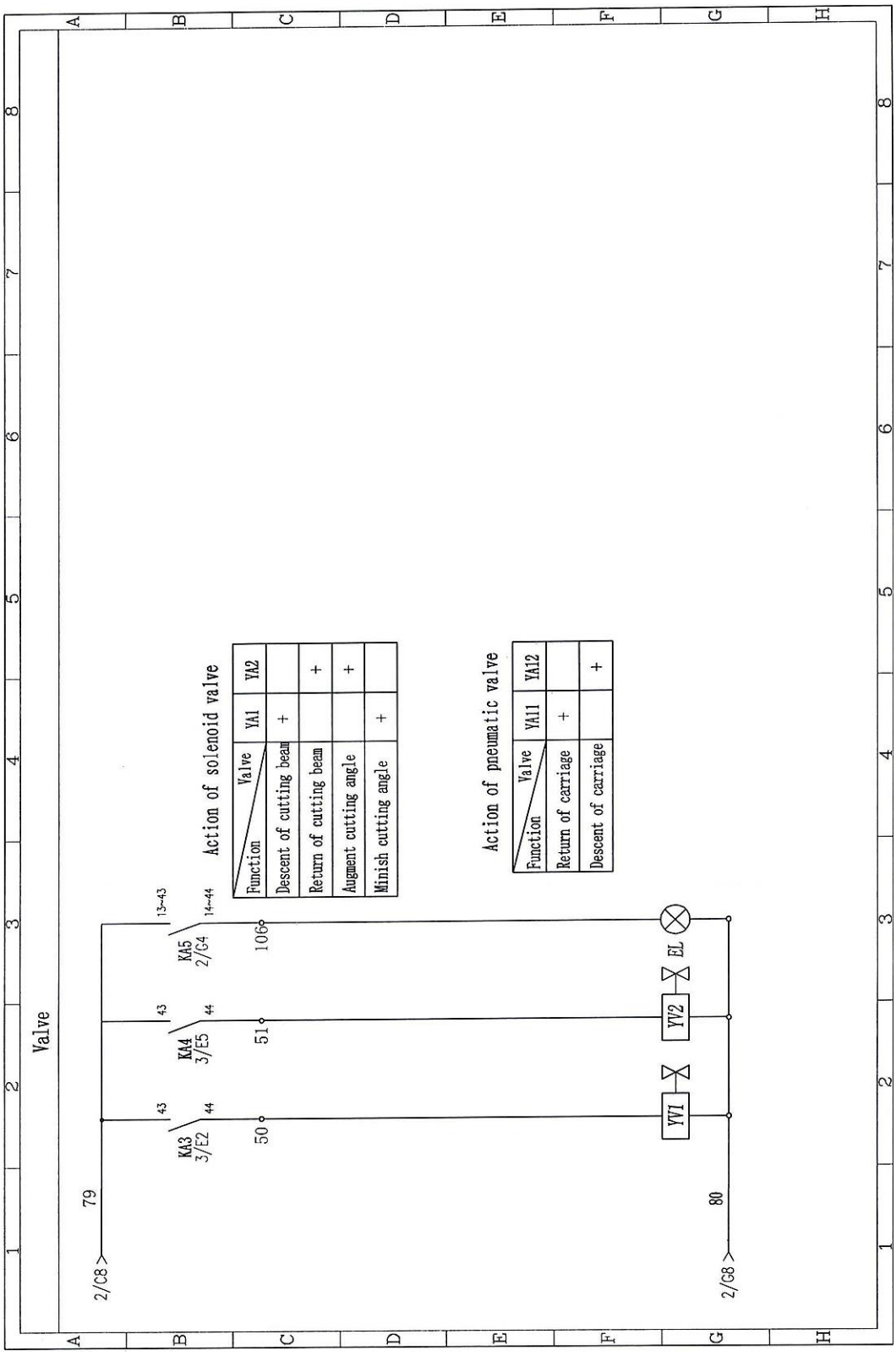

Electrical box
backward limit switch for backgauge
Forward limit switch for backgauge
Power
SQT1
SQT2
YA11
YA12
SB02
To footswich station
S1

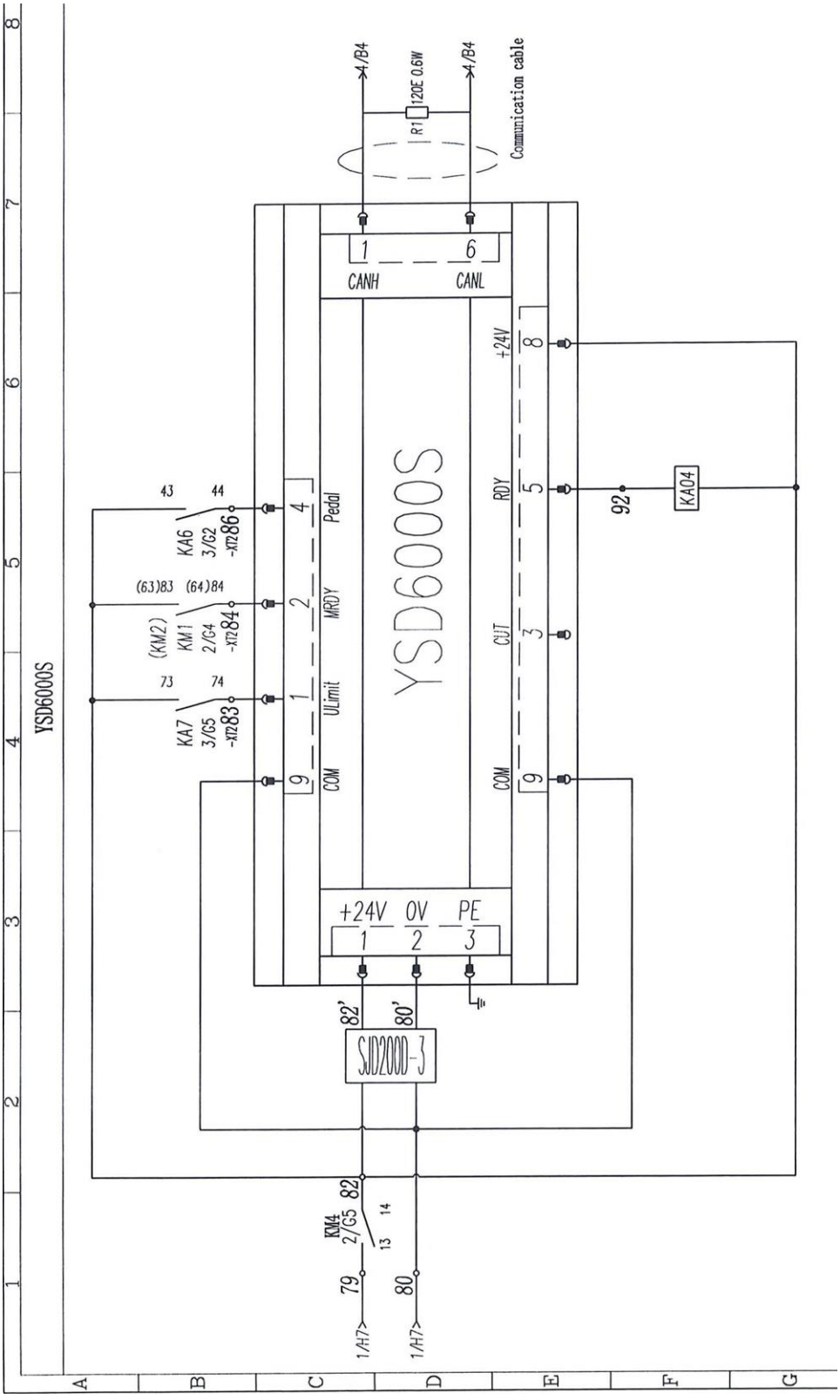
ELECTRICAL SCHEMATIC

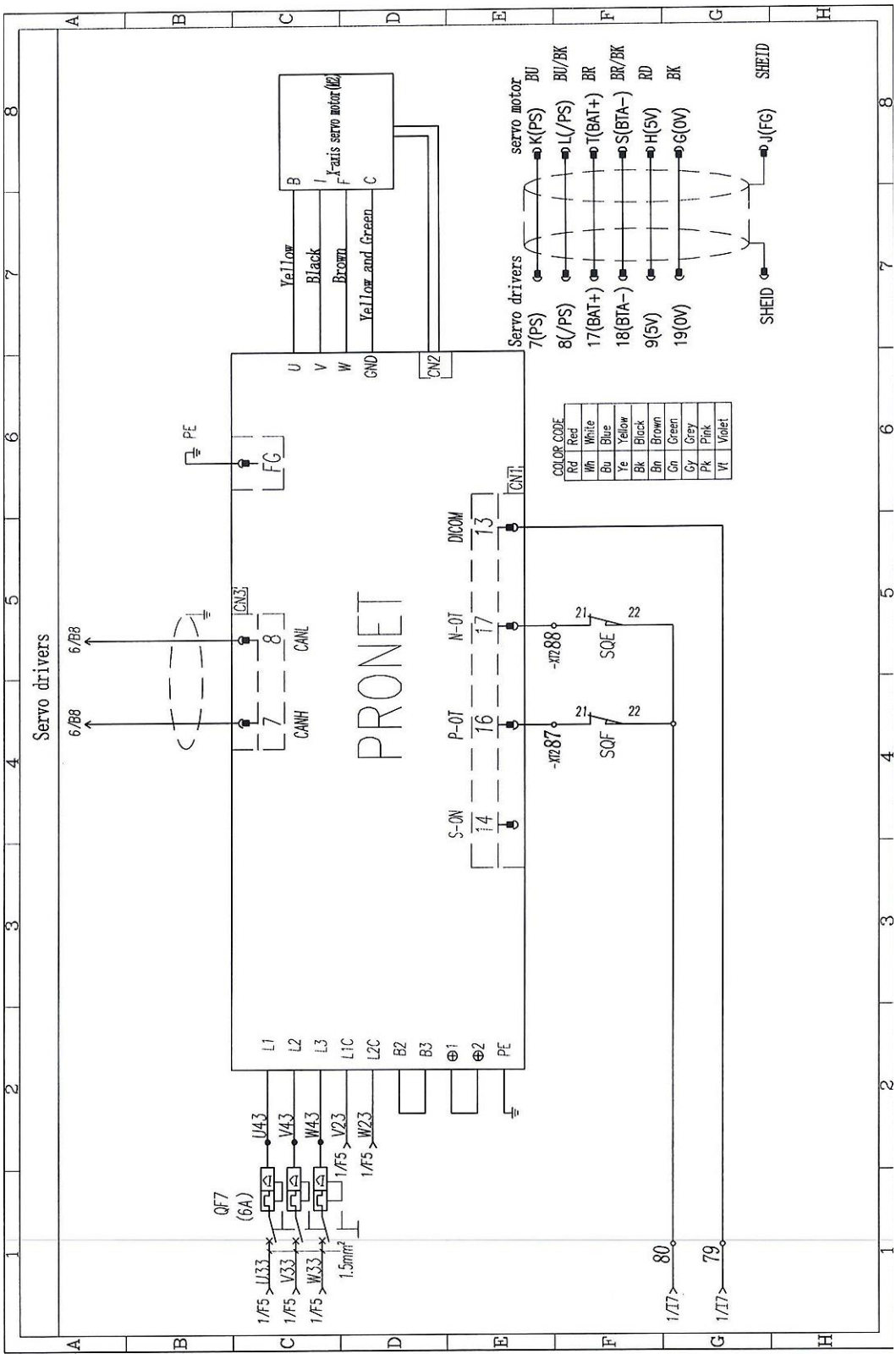



Power pilot lamp
NC Power
Main pump motor
Lighting lamps
Pump motor running pilot lamp
HL1
HL2
PC1
PC2
KA01
KA02
KM4
SA4
SB01
SB02
SQ1
SB1
SB2
FR1
1/E3
KM1
SA2
KA5
1/D7
1/G9
3/A1
3/F1

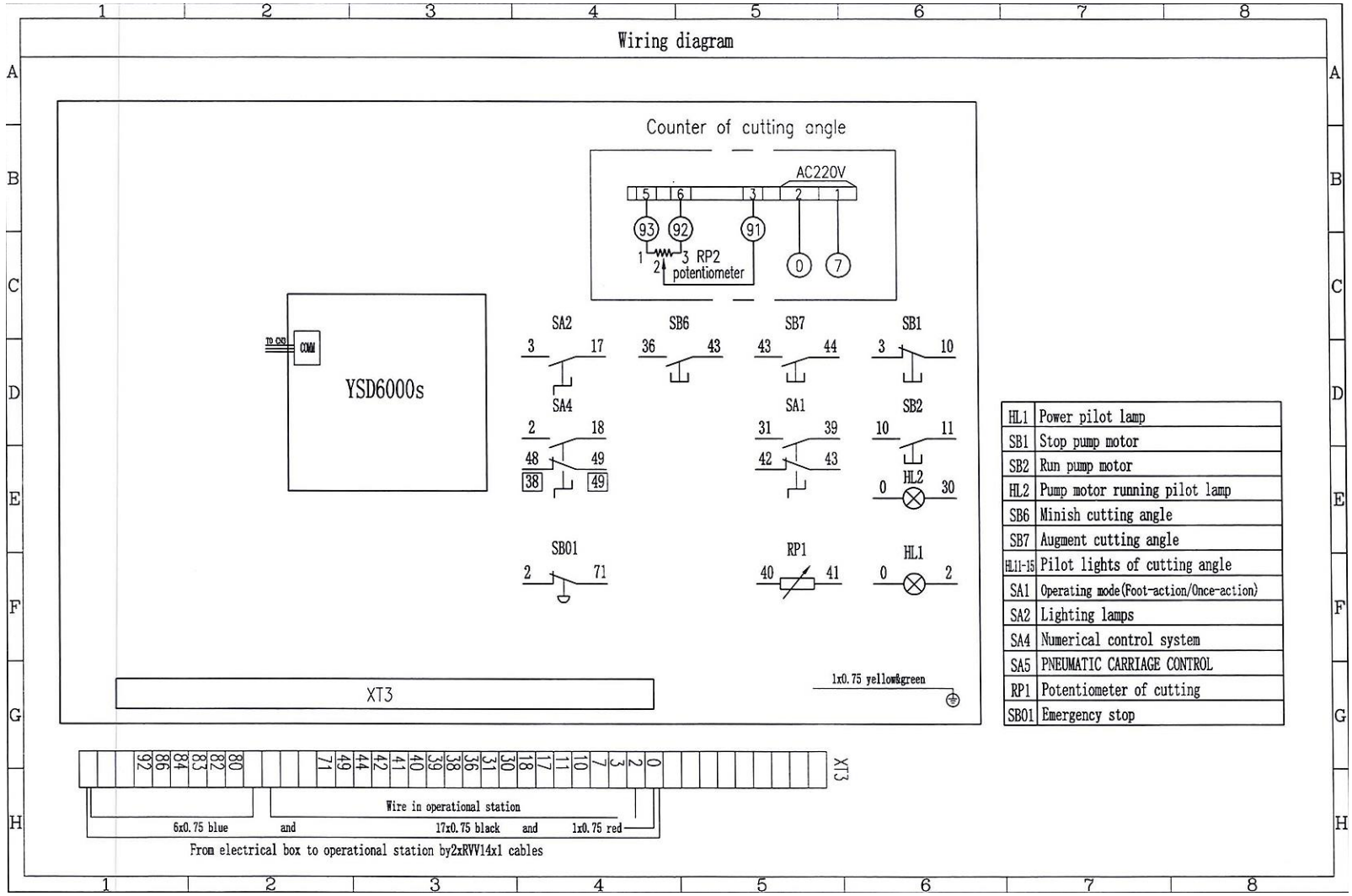

Ready to work
Descend of cutting beam
Cutting in sections
Charge for accumulator
Minish cutting angle∠-
Augment cutting angle∠+
SQG
KA7 G5
KA2 G1
S1
KA2 G1
KA3 G2
SA1
KA3 G2
KT4 F3
SQB
KA4 G5
KA6 E3
KA04 5/F5
SA4
KA2
KA3
KT3
KA6
KT4
RP1
SB6
SB7
SQD
KA7 G5
KA3 G2
KA2 G1
KA4
SQA
KA7
2/C8
2/G8


Valve
2/C8
79
KA3
3/E2
43
44
50
KA4
3/E5
43
44
51
KA5
2/G4
13~43
14~44
106
YV1
YV2
EL
80
2/G8
Action of solenoid valve
Function \ Valve
YA1
YA2
Descent of cutting beam
+
Return of cutting beam
+
Augment cutting angle
+
Minish cutting angle
+
Action of pneumatic valve
Function \ Valve
YA11
YA12
Return of carriage
+
Descent of carriage
+


YSD6000S
4/B4
R1 120E 0.6W
4/B4
Communication cable
1
6
CANH
CANL
YSD6000S
+24V
RDY
CUT
COM
Pedal
MRDY
ULimit
COM
8
5
3
9
4
2
1
9
43
44
KA6
3/G2
-XT2 86
(63)83
(64)84
(KM2)
KM1
2/G4
-XT2 84
73
74
KA7
3/G5
-XT2 83
92
KA04
+24V
0V
PE
1
2
3
82'
80'
SJD200D-3
82
KM4
2/G5
13
14
79
80
1/A7
1/A7
A
B
C
D
E
F
G
1
2
3
4
5
6
7
8


Servo drivers
PRONET
X-axis servo motor(MQ)
Yellow
Black
Brown
Yellow and Green
U
V
W
GND
CN2
servo motor
BU
BU/BK
BR
BR/BK
RD
BK
SHEID
K(PS)
L(/PS)
T(BAT+)
S(BTA-)
H(5V)
G(0V)
J(FG)
Servo drivers
7(PS)
8(/PS)
17(BAT+)
18(BTA-)
9(5V)
19(0V)
SHEID
COLOR CODE
Rd Red
Wh White
Bu Blue
Ye Yellow
Bk Black
Bn Brown
Gn Green
Gy Grey
Pk Pink
Vt Violet
PE
FG
CN3
CN1
6/B8
CANH
CANL
DICOM
N-OT
P-OT
S-ON
-KM88
-KM87
SQE
SQF
QF7
(6A)
L1
L2
L3
L1C
L2C
B2
B3
⊕1
⊕2
U43
V43
W43
V23
W23
U33
V33
W33
1.5mm²
80
79

Wiring diagram



HL1	Power pilot lamp
SB1	Stop pump motor
SB2	Run pump motor
HL2	Pump motor running pilot lamp
SB6	Minish cutting angle
SB7	Augment cutting angle
HL11-15	Pilot lights of cutting angle
SA1	Operating mode(Foot-action/Once-action)
SA2	Lighting lamps
SA4	Numerical control system
SA5	PNEUMATIC CARRIAGE CONTROL
RP1	Potentiometer of cutting
SB01	Emergency stop

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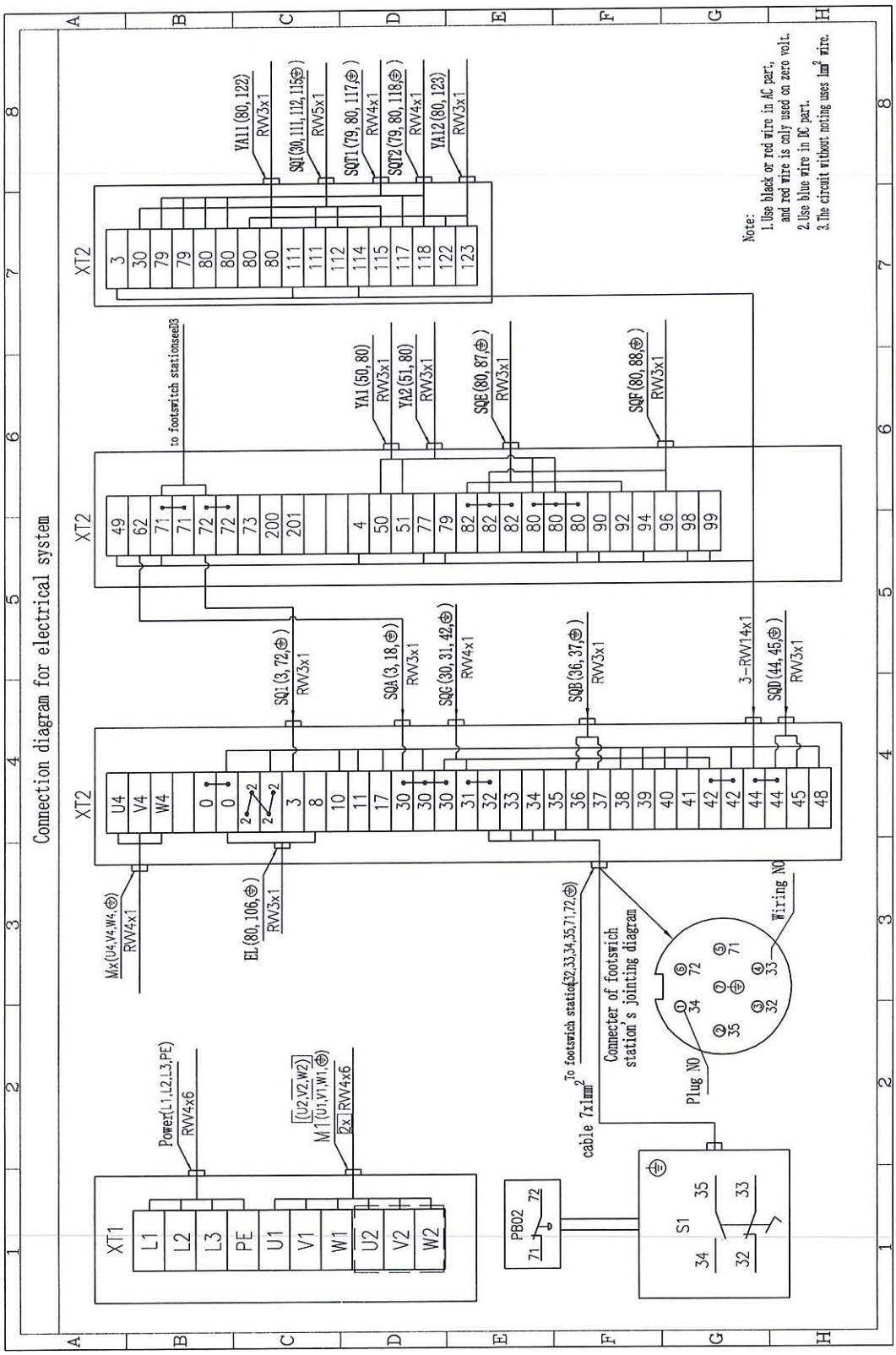
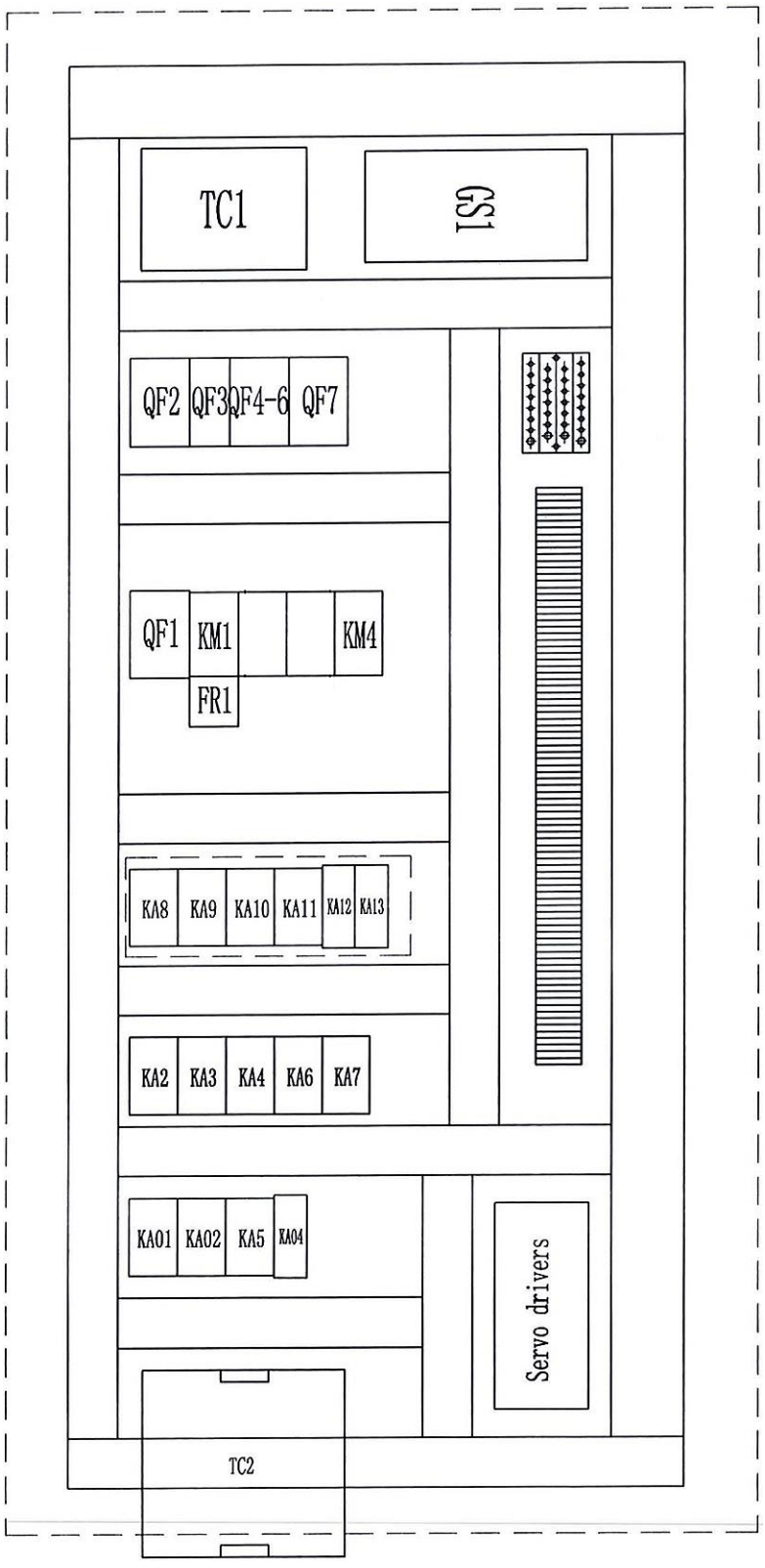

Connection diagram for electrical system
Note:
1. Use black or red wire in AC part, and red wire is only used on zero volt.
2. Use blue wire in DC part.
3. The circuit without noting uses 1mm² wire.
XT1
L1
L2
L3
PE
U1
V1
W1
U2
V2
W2
Power(L1,L2,L3,PE) RVV4x6
M1(U1,V1,W1,⏚) 2x RVV4x6
(U2,V2,W2)
XT2
U4
V4
W4
Mx(U4,V4,W4,⏚) RVV4x1
EL(80,106,⏚) RVV3x1
SQ1(3,72,⏚) RVV3x1
SQA(3,18,⏚) RVV3x1
SQC(30,31,42,⏚) RVV4x1
SQB(36,37,⏚) RVV3x1
3-RVV14x1
SQD(44,45,⏚) RVV3x1
to footswitch station
YA1(50,80) RVV3x1
YA2(51,80) RVV3x1
SQE(80,87,⏚) RVV3x1
SQF(80,88,⏚) RVV3x1
YA11(80,122) RVV3x1
SQ1(30,111,112,115⏚) RVV5x1
SQT1(79,80,117,⏚) RVV4x1
SQT2(79,80,118,⏚) RVV4x1
YA12(80,123) RVV3x1
PB02
S1
cable 7x1mm²
To footswich station(32,33,34,35,71,72,⏚)
Connecter of footswich station's jointing diagram
Plug NO
Wiring NO


TC1
GS1
QF2
QF3
QF4-6
QF7
QF1
KM1
KM4
FR1
KA8
KA9
KA10
KA11
KA12
KA13
KA2
KA3
KA4
KA6
KA7
KA01
KA02
KA5
KA04
Servo drivers
TC2

Electrical Components List

Code	Type	Name	Specifications	Qty.
QS	V2+KCF1PZ	Power switch	40A	1
QF1	GG45-D40-3P	Circuit breaker	40A, 3P	1
KM1	LC1-D32B7C	AC contactor	AC24V, 50-60Hz	1
	LAD-N31C	Auxiliary contact		1
FR1	LRD-32C	Thermo-relay	23-32A	1
TC1	JBK5-630	Transformer		1
QF3	GG45-D6-2P	Circuit breaker	6A, 2P	1
QF4	GG45-D10-1P	Circuit breaker	10A, 1P	1
QF5	GG45-D3-1P	Circuit breaker	3A, 1P	1
QF6	GG45-D6-1P	Circuit breaker	6A, 1P	1
QF2	GG45-D6-3P	Circuit breaker	6A, 3P	1
GS1	S-150-24	DC power		1
KA01-02, KA2-4, KA6-7	CAD-N32B7C	Relay	AC24V,50-60Hz	7
KA5	CAD-N50B7C	Relay	AC24V,50-60Hz	1
KT4	RE22R2AMR	Time delay	AC24V,50-60Hz	1
KA3	LAD-N02C	Auxiliary contact		1
KA21	DRM570024LT	Relay	24V, 10A	1
S1	MD-14H	Foot switch		1
	C408	Door lock		2
	PLT-307-RF+PM	Connector		1
	BNL-6	End section		8
	SAK2.5	Terminal block		60
	TT10-24	Terminal block		2
	TC6545S	Wiring trough		1m
	TC4545S	Wiring trough		4m
	PGH-1	NO. pipe		200
	V-5.5	Color pipe		15
	SG-1.5-380V/415V-200V	Transformer	3-380V/415V, 1.5kVA/3-200V,1.5kVA	1
	PRONET-10AMA	Servo drivers		1
	EMG-10ASB22	Servo motor		1

	YSD6000S	Numerical control system		1
	PAXD	Counter		1
RP1	RV30YN20SB203	Potentiometer		1
HL1	XB2-BVB1C	Power pilot lamp	1	
	ZB2-BS54C	Push button	1	
	ZB2-BZ102C	Push button		1
	XB 5-AA42C	Push button		1
	ZB2-BW33C	Push button		1
	ZB2-BWB31C	Push button		1
	XB5-AA21C	Push button		2
	ZB2-BG2C	Push button		2
	ZB2-BZ101C	Push button		4
	ZB2-BD2C	Push button		1
	ZB2-BE102C	Push button		1
SQG	XCK-M110	Limit switch		1
SQA, SQB, SQD, SQH, SQI	XCK-M115	Limit switch		5
SQ1	XCKN2145P20C	Limit switch		1
SQT1-2	Q85VR3LP-B	Photoelectric switch	AC24V	2

NOTES

NOTES

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