

**WYECO AUTO VALVES CO., LTD.**

**Diaphragm Type Control Valve  
Operation Manual**

The installation and use of control valve with positioner :

A : E/P Positioner

B : P/P Positioner

C : Air Set

1. Control valve with E/P positioner, P/P Positioner and air set

Setting of Air Set Pressure	Spring Range	Number of Spring
1.5 kg/cm <sup>2</sup> G	0.2 – 1.0 kg/cm <sup>2</sup> G	3
2.5 kg/cm <sup>2</sup> G	0.4 – 2.0 kg/cm <sup>2</sup> G	6
2.8 kg/cm <sup>2</sup> G	0.8 – 2.4 kg/cm <sup>2</sup> G	6

The pressure setting of air set and the range of spring is fixed. When E/P positioner receives electric signal, the positioner will input the pressure that is set by air set proportionally from "OUT 1" into pressure loading connection in order to actuate the valve.

Reference sheet of E/P positioner, P/P positioner and spring range.

E/P Output Signal	Spring Range
4 – 20 mA	0.2 – 1.0 kg/cm <sup>2</sup> G
4 – 20 mA	0.4 – 2.0 kg/cm <sup>2</sup> G
4 – 20 mA	0.8 – 2.4 kg/cm <sup>2</sup> G

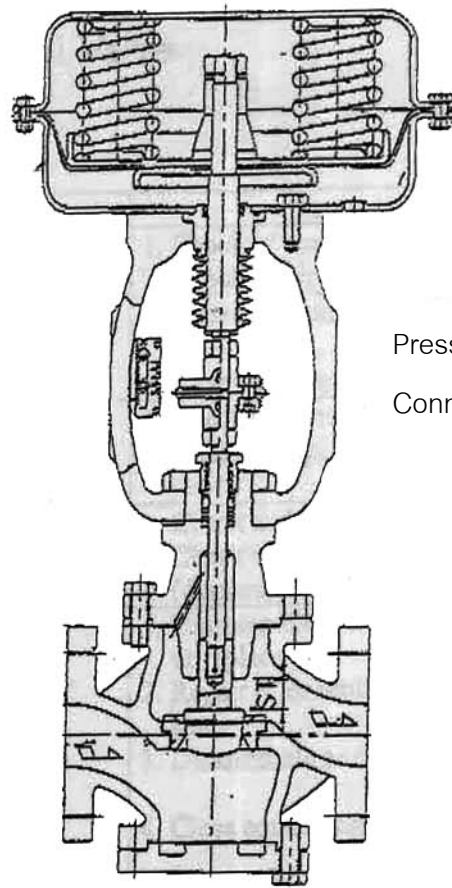
E/P Positioner Signal : 4 – 20 mA

4 – 12 mA , 12 – 20 mA

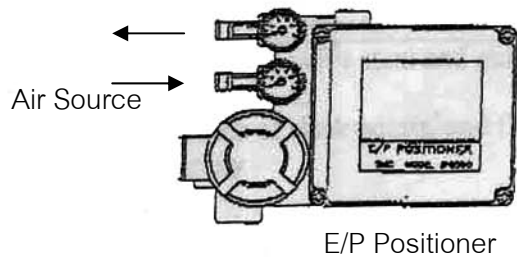
P/P Positioner Signal : 0.2 – 1.0 kg/cm<sup>2</sup>G

0.2 – 0.6 kg/cm<sup>2</sup>G

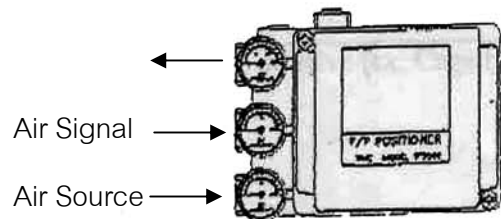
0.6 – 1.0 kg/cm<sup>2</sup>G



Pressure Loading Connection



E/P Positioner



Air Set



MAINTENANCE FOR CONTROL VALVE

Out of Order

Trouble	Reason	Remedy
Signal and supply air pressure failure	1. Air source (compressor) failure 2. Much leakage from piping	1. Check of compressor 2. Check of piping
Supply air pressure failure	1. Clogging of or leakage from piping 2. Regulator fault	1. Check of piping 2. Check and repair of regulator
Signal pressure failure	1. Controller fault 2. Clogging of or leakage from piping for signal	1. Check of controller 2. Check of piping
Positioner output failure	1. Positioner pilot valve fault 2. Much leakage from actuator	1. Check and repair of pilot valve 2. Check of actuator (diaphragm, etc)
Valve operation failure not withstanding operating pressure in actuator	1. Seizure of valve stem, guide 2. Much bending or breaking of valve stem 3. Biting of foreigner into valve port 4. Equalizing valve opened by springless type power cylinder	1. Disassemble, check valve body or replace 2. Repair of or replace of valve stem 3. Disassemble and check 4. Close equalizing valve

Vibration, Noise

Trouble	Reason	Remedy
Vibration and noise at any opening	1. Too large clearance between guide and valve stem 2. Slackness of joints between valve stem and port, valve stem and actuator stem, actuator stem and diaphragm, etc 3. Insufficient deaeration of fluid 4. Flashing of fluid on port outlet side	1. Check of valve stem and guide for abrasion 2. Check of slack points, and fix firmly 3. Deaeration of fluid 4. Change shape of valve
Vibration near medium-large valve opening	1. Natural vibration (Occurred during inversion of unbalancing force of valve stem in double seated valve except cage type)	1. Change of valve (ex. Cage type)
Plug hitting seat near fully closed position	1. Fault of flow direction (Flow to close)	1. Change valve installed position to flow to open, Recheck required Cv valve and readjust controlling position
Shock wave being generated on valve	1. Too small valve plug size (Steam)	1. Enlarge plug size

Hunting of Valve

Trouble	Reason	Remedy
Fluctuation of supply air pressure	<ol style="list-style-type: none"> <li>1. Lack of air capacity</li> <li>2. Regulator fault</li> </ol>	<ol style="list-style-type: none"> <li>1. Install more compressors</li> <li>2. Check and repair of regulator</li> </ol>
Fluctuation of signal pressure	<ol style="list-style-type: none"> <li>1. Inadequate control system resistance of capacity</li> <li>2. Control system fault</li> </ol>	<ol style="list-style-type: none"> <li>1. Insert orifice or capacity tank into signal circuit</li> <li>2. Check controller</li> </ol>
Hunting without changing of supply pressure and signal	<ol style="list-style-type: none"> <li>1. Positioner fault</li> <li>2. Too much valve stem friction</li> <li>3. Too much gland packing friction</li> <li>4. Resonance with turbulent wave motion of fluid (Fluctuation of axial thrust due to fluctuation of fluid pressure)</li> </ol>	<ol style="list-style-type: none"> <li>1. Change of pilot valve. Slackness of positioner parts</li> <li>2. Check of friction bending of valve stem and guide</li> <li>3. Replacement of packing</li> <li>4. Reduce differential pressure.</li> </ol> <p>Replace actuator with one of large rigidity. Install rectifying straight pipe ahead valve</p>

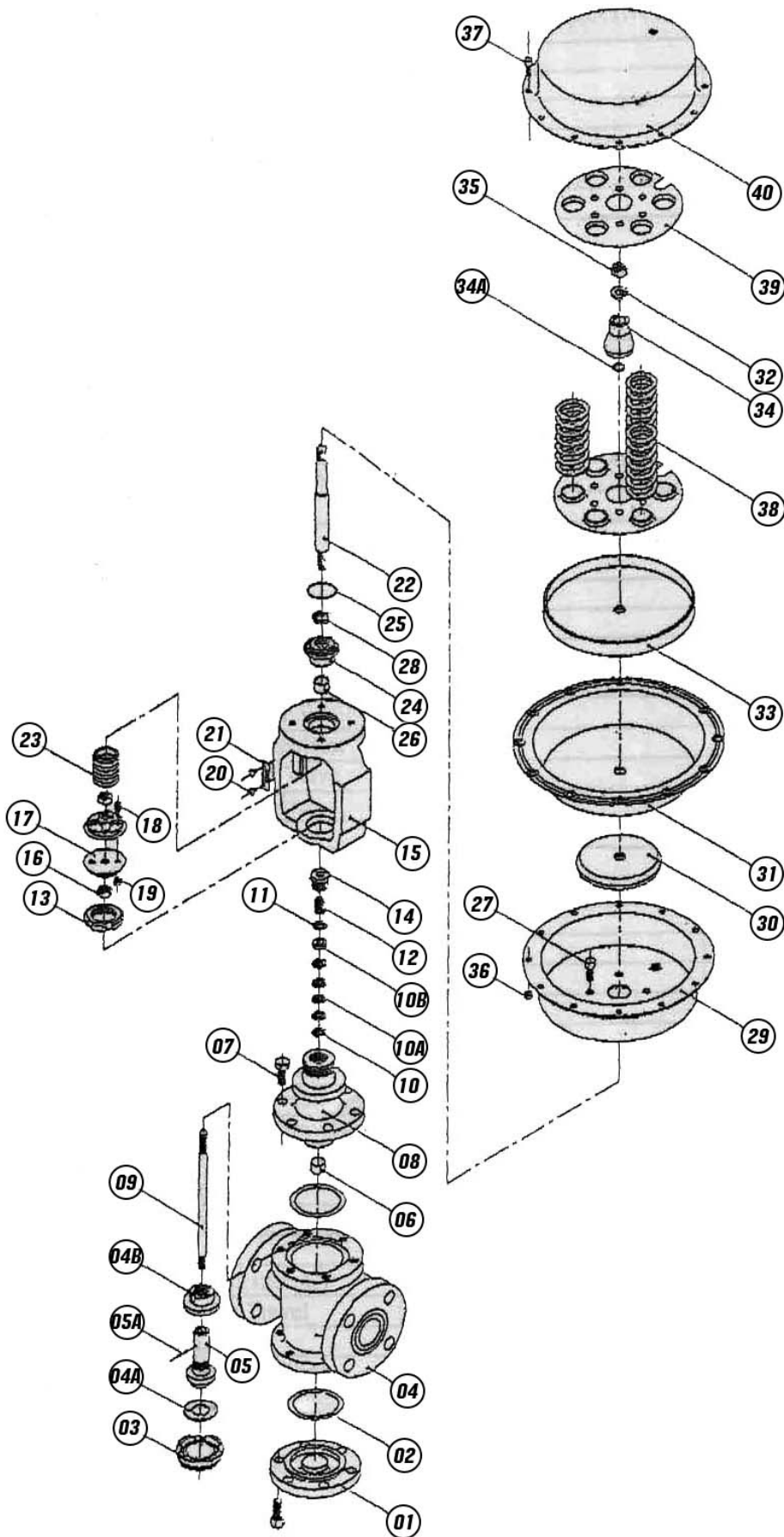
Slow Valve Operation

Trouble	Reason	Remedy
Slow in both ways of stroke	<ol style="list-style-type: none"> <li>1. Slurry or solid substance trapped in guide</li> <li>2. Abrasion of piston ring of springless power cylinder</li> <li>3. Deterioration and hardening of gland packing</li> </ol>	<ol style="list-style-type: none"> <li>1. Disassemble and clean Alter type of valve (Angle valve, etc.)</li> <li>2. Replace piston ring</li> <li>3. Replace packing grease Alter packing material</li> </ol>
Slow only in one way of stroke	<ol style="list-style-type: none"> <li>1. Too Large axial thrust due to differential pressure of fluid</li> <li>2. Too large actuator capacity</li> <li>3. Valve operating pressure leaking from actuator</li> </ol>	<ol style="list-style-type: none"> <li>1. Furnish positioner Furnish actuator of large output</li> <li>2. Furnish positioner or booster.</li> <li>3. Check of actuator each parts</li> </ol>

Much Leakage

Trouble	Reason	Remedy
Valve stem at fully closed position	<ol style="list-style-type: none"> <li>1. Corrosion, erosion, damage of valve seat</li> <li>2. Leakage through blowhole in valve body</li> <li>3. Corrosion, erosion of threaded section of valve seat</li> </ol>	<ol style="list-style-type: none"> <li>1. Lapping of seat</li> <li>2. Repair faulty part or replace</li> <li>3. Replace valve seat or gasket</li> </ol>
Valve stem not reaching fully closed position	<ol style="list-style-type: none"> <li>1. Too large differential pressure at valve</li> <li>2. Biting of foreigner into port</li> <li>3. Seizure between guide and port</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase actuator torque</li> <li>2. Disassemble and clean</li> <li>3. Repair faulty part</li> </ol>
Reduced rangeability due to change in control position	<ol style="list-style-type: none"> <li>1. Corrosion, erosion of plug and seat</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace plug and seat</li> </ol>

Trouble	Reason	Remedy
Too large hysteresis	<ol style="list-style-type: none"> <li>1. Off-centering of valve stem and guide</li> <li>2. Deterioration and hardening of gland packing</li> <li>3. Biting of foreigner into plug</li> <li>4. Slurry or solid substance trapped in valve stem, guide</li> </ol>	<ol style="list-style-type: none"> <li>1. Check of valve stem for bending</li> <li>2. Replace packing</li> <li>3. Disassemble and clean</li> <li>4. Disassemble and clean</li> </ol>
No movement of valve stroke	<ol style="list-style-type: none"> <li>1. Handwheel being not at neutral position</li> <li>2. Insufficient air pressure to positioner supply</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn handwheel to neutral position</li> <li>2. Check of supply air pressure</li> </ol>
Leakage through gland packing	<ol style="list-style-type: none"> <li>1. Insufficient tightening of gland nut</li> <li>2. Deterioration and Hardening of gland packing</li> <li>3. Faulty arrangement of gland packing</li> <li>4. No greasing</li> <li>5. Corrosion, erosion, abrasion, and damage of valve stem</li> </ol>	<ol style="list-style-type: none"> <li>1. Retighten</li> <li>2. Replace packing (Study material)</li> <li>3. Replace packing</li> <li>4. Grease</li> <li>5. Repair or replace valve stem</li> </ol>



Diaphragm Control Valve (2 - Way)		
No	Parts	Qty
01	Bottom Flange	1
02	Seat Ring Gasket	2
03	Seat	1
04	Valve Body	1
4A	Seat Ring	1
4B	Cap Nut	1
05	Valve Plug	1
5A	Pin	1
06	Seal Bushing	1
07	Hexagon Head Bolt	8
08	Bonnet	1
09	Valve Plug Stem	1
10	V-Packing	1
10A	V-Packing	4
10B	V-Packing	1
11	Washer	1
12	Spring	1
13	Yoke Locknut	1
14	Cap Nut	1
15	Yoke	1
16	Hexagon Cap Nut	2
17	Travel Indicator	2
18	Head Bolt	2
19	Cap Nut	2
20	Nut	2
21	Travel Indicator Scale	1
22	Diaphragm Steam	1
23	Rubber Boot	1
24	Stem Seal	1
25	O-Ring	1
26	Sral Bushing	1
27	Hexagon Head Bolt	4
28	Packing	1
29	Diaphragm Case	1
30	Diaphragm Plate Seat	1
31	Diaphragm	1
32	Spring Washer	1
33	Diaphragm Plate	1
34	Stem Connector	1
34A	O-Ring	1
35	Hexagon Cap Nut	1
36	Hexagon Cap Nut	12
37	Haxegon Head Bolt	12
38	Spring	3
39	Spring Seat	2
40	Diaphragm Case	1

CONTROL VALVE SPECIFICATION SHEET

Item No.					Tag. No.	
Quantity					Model No.	
Rated Cv					Rated Travel (mm)	
Flow Direction					Rangeability	
Design Press.					Design Temp.	
Line Size (mm)					Sch. No.	
Body	Type					
	Size					
	Rating					
	Plug / Characteristic					
	Bonnet					
Materials	Body					
	Trim					
	Guide					
	Gland Packing					
	Gasket					
Actuator	Type					
	Size					
	Spring Range					
	Hand Wheel					
Action	Signal Increase To					
	Failure Position					
Accessories	Positioner					
	Filter Regulator					
	Solenoid Valve					
	Limit Switch					
	Others					
Service Condition	Fluid & State					
		Units	Max. Flow	Nor.Flow	Min.Flow	
	Flow Rate					
	Inlet Press.					
	Outlet Press.					
	Press. Drop					
	Shut off Press.					
	Vapor Press.					
	Critical Press.					
	Specific Gravity					
	Mol. Weight					
	Temp.					
Viscosity						
Sizing Data			Max.Flow	Nor.Flow	Min.Flow	
	Calculation Cv					
	Valve Travel					
	FL					
	Flow condition					
	SPL					
Outlet Velocity						
Allowable Seat Leakage						
Note :				Prep'd	Approved	

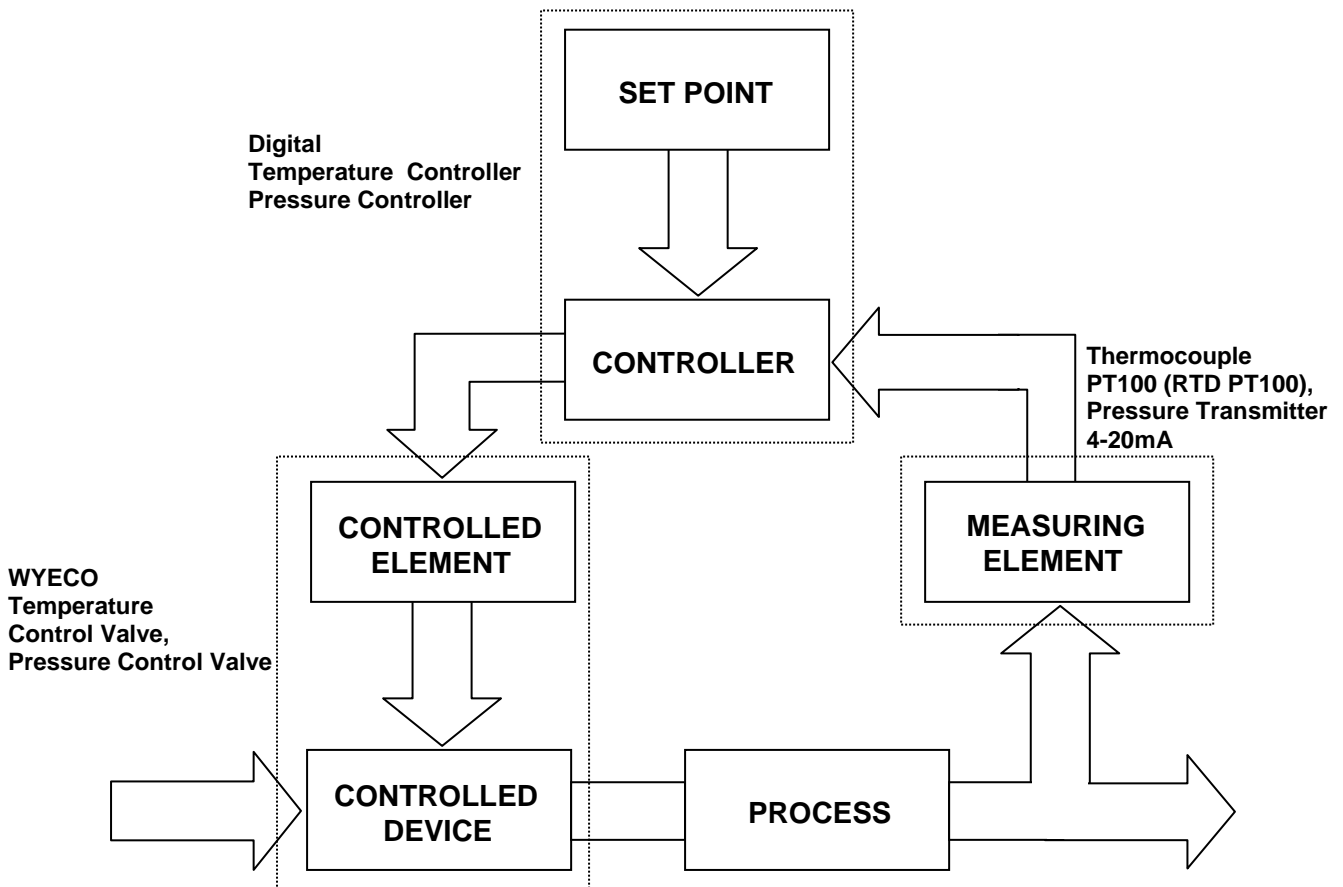
# “WYECO” Proportional Temperature Control Valve or Pressure Control Valve

## การทำงาน

มีลักษณะการทำงานเป็นแบบ Proportional Control โดยการป้อนสัญญาณ INPUT 4 ~ 20mA DC โดยควบคุมจากอุปกรณ์ควบคุมอุณหภูมิ หรือควบคุมความดัน และมีการตรวจวัดจากอุปกรณ์ตรวจจับอุณหภูมิ หรือ Pressure Transmitter

## การใช้งาน “WYECO” : WY – D 02 GS

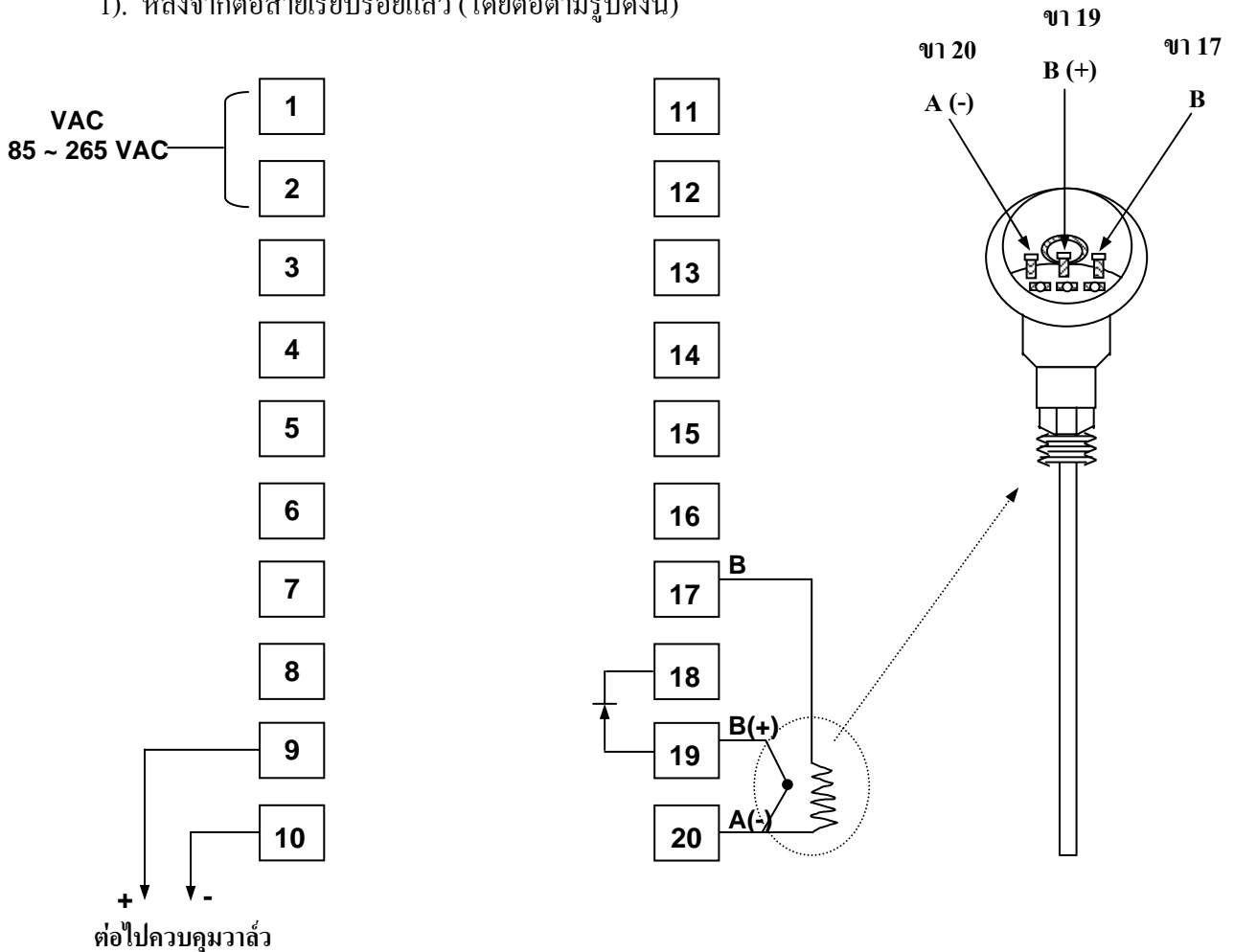
- BLOCK DIAGRAM (PROPORTIONAL CONTROL : TEMPERATURE CONTROL, PRESSURE CONTROL)





## การใช้งาน DIGITAL TEMPERATURE CONTROLLER : MC - 2538 - 301

1). หลังจากต่อสายเรียบร้อยแล้ว (โดยทำตามรูปดังนี้)



ต่อไปควบคุมวาล์ว

2). ตั้งค่าโปรแกรมดังนี้

### LEVEL 1 (USER LEVEL)

- ตั้งค่า SV โดยการกดปุ่ม **<** เลือกหลักที่ต้องการตั้งค่า
- เลือกค่าเพิ่ม - ลด โดยการกดปุ่ม **▲** หรือ **▼**
- เมื่อได้ค่าที่ต้องการให้กดปุ่ม **SET**

### LEVEL 2 (PID LEVEL)

- กดปุ่ม **SET** ค้างไว้ 5 วินาที จะเข้าสู่โหมด PID หน้าจอจะเป็น P1 ที่ช่อง PV และตั้งค่าต่างๆให้เป็นค่าตั้งต้นตามคู่มือ
- หลังจากนั้นกดปุ่ม **SET** ค้างไว้ 5 วินาที เพื่อออกจากโหมด PID

### SET AUTO TUNING (AT)

- ตั้งค่าควบคุมระบบอัตโนมัติ โดยการกดปุ่ม **SET** ที่ช่อง PV จะปรากฏ **At**

2. กดปุ่ม  หลักที่ช่อง SV จะกระพริบ
3. ให้กดปุ่ม  เพื่อกด SV เป็น “YES”

เป็นอันสมบูรณ์สำหรับการตั้งค่าต่างๆ ของ DIGITAL TEMPERATURE CONTROLLER