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CKD

SM-206229-A

INSTRUCTION MANUAL

EASY WIRING SELEX VALVE

4TB4

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this instruction manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ Precautions

- Do not touch electric wiring connections (exposed live parts) : this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

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4TB4

EASY WIRING SELEX VALVE

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1. PRODUCT

1.1 Specifications

(1) Specification of solenoid valves

Item \ Series, model No., position, number of solenoids	4TB4 Series				
	4TB410, 2-position, single	4TB420, 2-position, double	4TB430, 3-position, all port block	4TB440, 3-position, A·B·R connection	4TB450, 3-position P·A·B connection
Media	Compressed air				
Actuation	Pilot (soft spool)				
Maximum working pressure MPa	1.0				
Minimum working pressure MPa	0.15	0.1	0.2		
Proof pressure MPa	1.5				
Ambient temperature °C	5~50				
Media temperature °C	5~50				
Effective sectional area mm^2	70		60		
Response time ms	50 or less (at 0.5 MPa)		70 or less (at 0.5 MPa)		
Manual override	Non-lock type, lock type (optional)				
Lubrication	Not required {If lubrication is used, use Class 1 turbine oil ISO VG 32 (#90)}				
Protection structure	Dust-proof, drip-proof (optional)				

- The above response time applies to the operation with no lubrication at supply pressure of 0.5 MPa when the power is turned ON. This value varies depending on the pressure and the type of lubrication used.

(2) Electrical specifications

Rated voltage	V	AC100V50/60Hz	AC200V50/60Hz	DC24V
Inrush current A	A	0.056/0.044	0.028/0.022	0.080
Holding current	A	0.028/0.022	0.014/0.011	
Power consumption (with indicator light)	W	1.8/1.4	1.8/1.4	1.9
Temperature rise	°C	50		
Voltage fluctuation range		±10%		
Insulation class		B class mold coil		
Surge absorber		Standard		
Indicator		Standard		

- 100 and 200 V AC coils can be used at 110 and 220 V AC (60 Hz), respectively.

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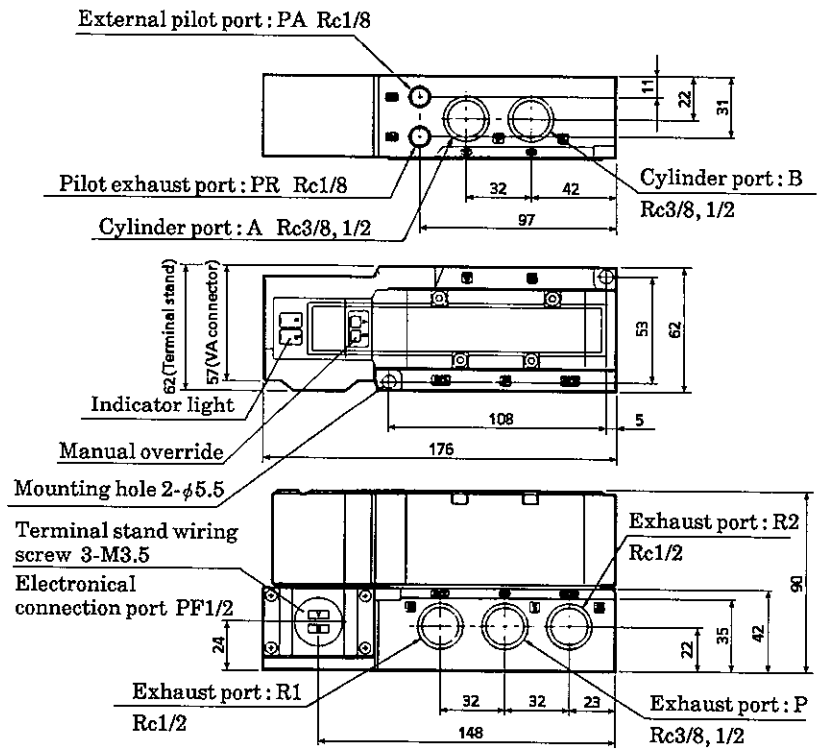
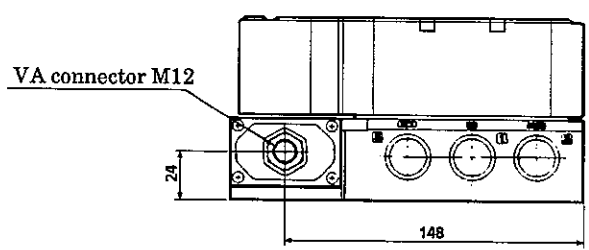
1.2 External Dimensions

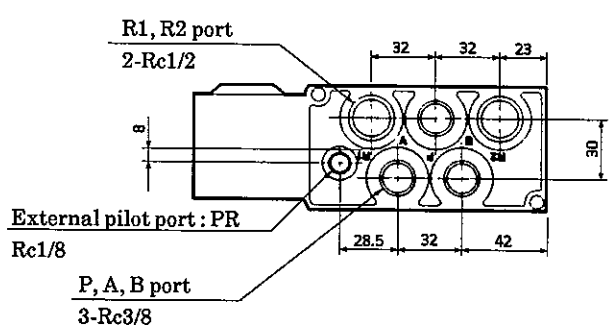
● 4TB4※0-※-※ (terminal stand type)



● 4TB4※0-※-※R (VA connector type)



● 4TB4※0-08Y-※ (Bottom porting)



2. CAUTION

2.1 Notes on Use of the Product

1) Environmental conditions

(1) If the atmosphere of the installation site contains a large amount of dust, fit a silencer or an elbow downward on the R1 and R2 ports to provide this product with protection against dust.

(2) If this product is exposed to water, install a cover or panel over it as protection against water.

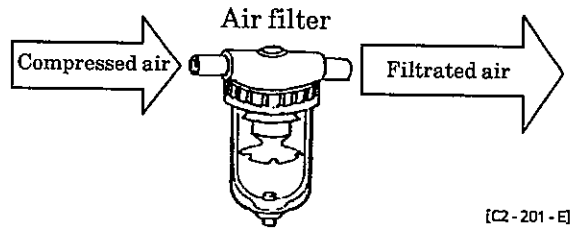
2) Notes on installation of attachments

(1) Filters

Use filters with an element of 5μm or less.

(2) Lubrication

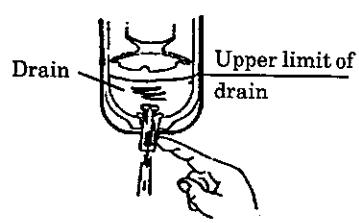
The 4TB4 requires no lubrication. (If lubrication is used, use Class 1 turbine oil ISO VG 32 (#90) or equivalent.)



[C2-201-E]

3) Measures against drain

Compressed air contains a large amount of drain (water, oxidized oil, tar, and foreign matter). Since these substances significantly reduces the reliability of air compressors, effective measures against drain are required as described below.



[C2-201-F]

- Drain removing measures

Drain removing measures include dehumidifying air with after-cooler dryers; eliminating foreign matter with filters; and eliminating tar with tar-elimination filters.

4) Super dry air

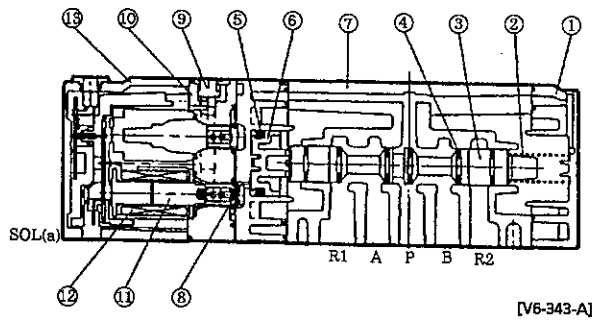
The life of the 4TB4 becomes shorter if super dry air is used. CKD recommends use of DC voltage-driven solenoid valves.

3. OPERATION

3.1 Description of Operation

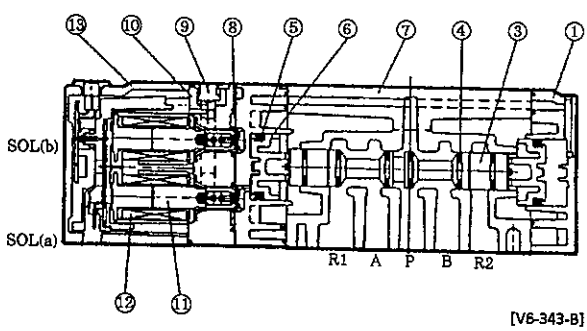
Drawing for simplex operation

- 4TB419
  When de-energized
  (shown in the drawing)
  P → B
  A → R1 (with R2 closed)
  When energized
  P → A
  B → R2 (with R1 closed)
  PR is the pilot exhaust port.



[V6-343-A]

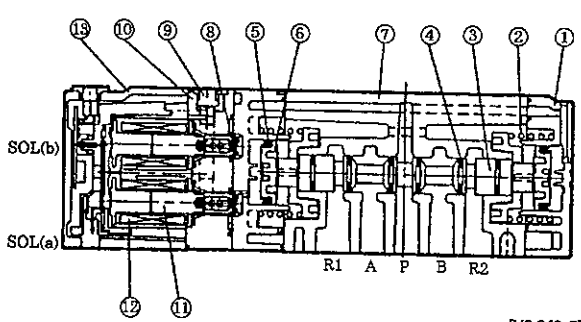
- 4TB429
  When SOL "B" is de-energized
  (shown in the drawing)
  P → B
  A → R1 (with R2 closed)
  When SOL"A" is energized
  P → A
  B → R2 (with R1 closed)
  Once energized, the solenoid retain the position even after power OFF.



[V6-343-B]

3

- 4TB449
  5
  When 4TB430 is de-energized
  (shown in the drawing)
  P, A, B, R1, and R2 are closed.
  When 4TB440 is de-energized
  P (closed)
  A → R1
  B → R2
  When 4TB450 is de-energized
  P → A and B
  R1 and R2 (closed)
  When SOL"B" or SOL"A" is energized, it forms the same structure as the 4TB420.



[V6-343-C]

※ This table lists the parts and their materials of the 4TB439.

Part No.	Part name	Material	Remark	Part No.	Part name	Material	Remark
①	Cap	Polyphenylene sulfide		⑧	Valve seat	Nitril rubber	
②	Spring	Steel wire for springs		⑨	Manual button	Acetal resin	
③	Spool	Aluminum		⑩	Pilot valve	Polyphenylene sulfide	
④	Spool packing	Nitril rubber		⑪	Plunger assembly	—	
⑤	Y-lip packing	Nitril rubber		⑫	Coil assembly	—	
⑥	Piston	Acetal resin		⑬	Cover	Polyphenylene sulfide	
⑦	Body	Diecast aluminum alloy	Coated				

3.2 Notes on Operation

1) Working pressure range

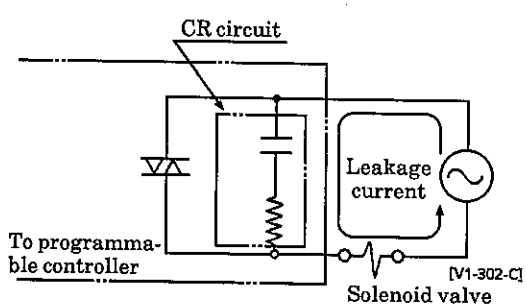
The 4TB4 uses internal pilot operated type solenoid valves. Accordingly, check the lowest working pressure, including that during the pressure drop in your application and be sure to use the 4TB4 at the minimum working pressure or more.

	Minimum working pressure MPa
4TB410	0.15
4TB420	0.10
4TB430	0.20
4TB440	
4TB450	

2) Solenoid valve

- Limit on leakage current

If the 4TB4 is used with a programmable controller, check if the output leakage current of the programmable controller is within the following specified ranges. Any value greater than the following will cause malfunctions of the solenoid valve.



1.8 mA or less at 24V DC
1.5 mA or less at 200V AC
3 mA or less at 100V AC

- Working voltage

100V AC, 200V AC (50/60 Hz) types can operate on 110V AC, 220V AC (50/60 Hz)

- Continuous energize

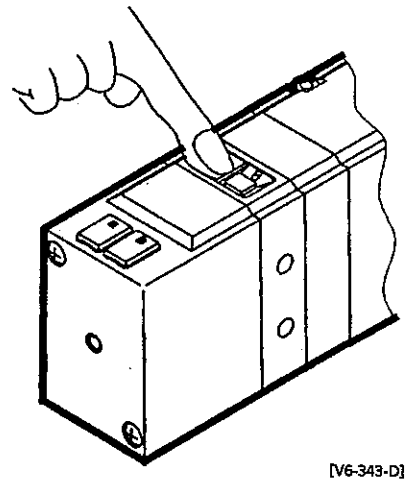
If mounted in a control panel or energized for a long time, the 4TB4 will be heated to high temperatures. In this case, take heat radiation measures, such as providing cooling air current.

3) Manual override

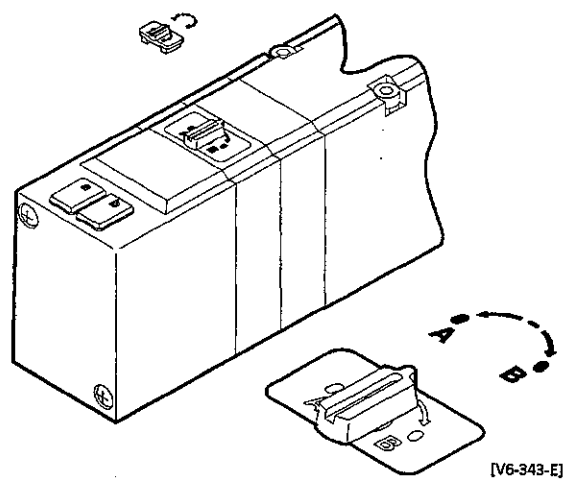
- Manual override

Since the 4TB4 is a pilot operated type solenoid valve, operating the manual override does not switch the main valve unless air is supplied to the supply (R) port.

- Non-lock type manual override
  If a non-lock type manual override is installed, press the manual override button until it stops. The valves of a 3-position single solenoid assume the same positions as when energized while the button is pressed. Upon release, the valves return to the previous positions. The valves of a 2-position double solenoid assume the same positions as when A (B) is energized while the A (B) side button is pressed. Upon release, the main valve retains the previous position. To return the main valve to the previous position, operate the B (A) side button of the manual override.



[V6-343-D]



[V6-343-E]

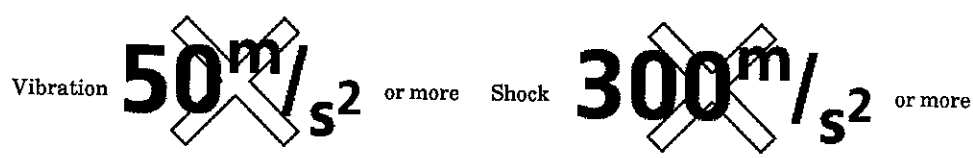
- Lock type manual override
  Turning a lock type manual override approximately 90 degrees towards the A (B) side (either manually or with a screwdriver) causes the valves to lock in the same positions as when energized.
  With a 3-position type solenoid, set the switch to the middle position to obtain the neutral position.
  If you forcibly turn the switch when it is locked, the switch will be damaged. Also, be sure that a lock type manual override is released before starting normal operation.

4) Response time
- Supply pressure
  The response time in the catalog applies to the operation with no lubrication at supply pressure of 0.5 MPa during energizing.
- Lubrication
  Excessive lubrication or extremely low pressure may increase the response time.

4. INSTALLATION

4.1 Piping

1) A or B Port should not be released to the atmosphere when the supply (P port) is restricted.
2) When the 3-position, all-port-block 4TB430 is used, make sure that piping between the solenoid valve and the cylinder is free from leakage.
Also, the rod packing and the piston packing of the cylinder must be free from leakage.
If there is any leakage, the cylinder may not stop but continue to travel when all the ports of the valve are blocked. If a long-term, intermediate stop or a high degree of stopping precision is required, use a cylinder with a brake.
3) There is no restriction of mounting posture of solenoid valve. It is still recommended to install the unit on a flat and horizontal surface. Avoid installation of the unit where there is vibration more than 50m/s^2 or shock more than 300m/s^2.



4.2 Environmental Conditions

1) Dust
If the atmosphere of the installation site contains a large amount of dust, it may cause malfunctions or leakage. To avoid these problems in dusty environment, fit R port with a silencer or an elbow facing down as protection against dust.
2) Water and machining oil
Exposing the 4TB4 to water or machining oil will cause an electrical leak or coil burn. If this occurs, install a cover or panel over it as protection.
If the 4TB4 cannot be completely protected from water or cutting oil, use the optional drop-proof type. If the cylinder rod is exposed to cutting oil, the oil will eventually enter the cylinder and then the pipe connected to the solenoid valve, resulting in a malfunction. If this problem cannot be eliminated, consult CKD.
3) Continuous energizing
If installed in a control panel or energized for a long time, the 4TB4 will be heated to high temperatures. In this case, take heat radiation measures, such as providing cooling air current.

4) Corrosive environment

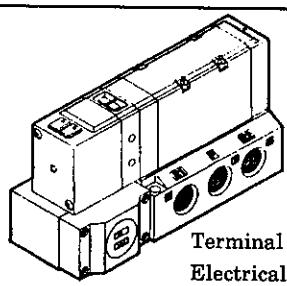
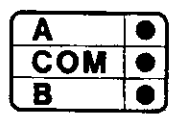
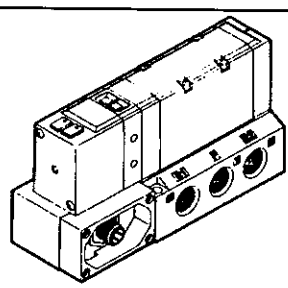
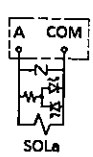
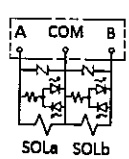
Do not use the 4TB4 in an atmosphere containing corrosive gas, such as sulfur dioxide.

Consult CKD if the 4TB4 is exposed to see breezes or sea water.

5) Ambient temperature

Consult CKD if the 4TB4 is used at extreme temperatures exceeding 50°C or below 5°C.

4.3 Electrical Wiring

Name	Code	Appearance	Terminal wiring
Terminal stand	No code	 Terminal screw size: M3.5 Electrical connection port: PF1/2	
VA connector	R		
Solenoid valve internal circuit diagram	Single		Double 

Note 1) With the VA connector type solenoid valve, the configuration of the cable connector for AC power differs from that for DC power.

- Connection cables for VA connector type (examples)

Name of manufacturer	Model No. (main models)
OMRON	XS2F-D421-C80-A
	XS2F-D421-C81-A
C. CORRENS & CO., LTD.	VA-4DSX1H4
	VA-4DSB1H4
Yamatake Honeywell	PA5-4ISX2HK
	PA5-4ISBX2HK

Note 2) The upper model No. indicates a one-side connection cable and the lower model No. a double-sided connection cable (male and female).

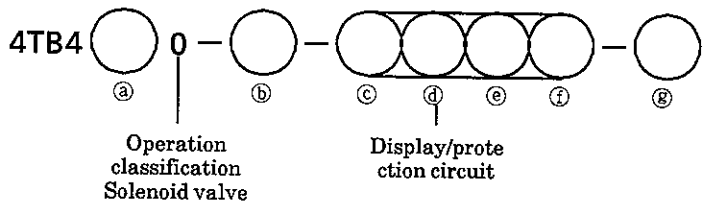
Note 3) The above table lists the model Nos. of main DC-type, 4-core connection cables. For further details, contact the manufacturers.

5. MAINTENANCE

5.1 Regular Inspection

1) Perform inspection once or twice a year to maintain the solenoid valve in the optimal condition.
2) During inspection, check for loose screws, dirt and foreign matter deposits, and drain in the pipes. Remove any of these substances by blowing air through the pipes.

6. HOW TO ORDER



ⓐ Position/operator type	
Code	Description
1	2-position, single
2	2-position, double
3	3-position, all-port block
4	3-position, A·B·R port connection
5	3-position, P·A·B port connection

ⓑ Port size (cylinder port)	
Code	Description
10	Rc3/8
15	Rc1/2
10Y	Rc3/8(Bottom porting)

- The above port sizes are those of P-A-B ports.
  The port size of R port is Rc1/2 and that of PR and PA ports is Rc1/8.

ⓒ Manual override	
Code	Description
No code	Non-lock type manual override
M1	Lock type manual override

ⓓ Display/protection circuit	
Code	Description
L	With indicator light surge absorber
No code	Without indicator light surge absorber

ⓔ Electrical connection	
Code	Description
No code	Terminal stand
R	VA connector (drip-proof)

ⓕ Option	
Code	Description
K	External pilot

ⓖ Voltage		
Code	Description	
1	100 V AC, 50/60 Hz	Standard
2	200 V AC, 50/60 Hz	
3	24 V DC	
4	12 V DC	Option
5	110 V AC, 50/60 Hz	
6	220 V AC, 50/60 Hz	