# CVE2/CVSE2 CVE3/CVSE3

(Coolant valve)

For coolant

Air operated 2, 3 port valve (coolant control)

Series variation

#### Overview

This is a reliable 2, 3 port coolant valve with cylinder drive method.

This valve for tool machine cutting oil or coolant control incorporates a metal seal to prevent the entry of cutting chips, abrasive grains and foreign debris, and ensures highly reliable control.

The air operated type and solenoid valve mounted type are available. These can be used in precise machines.

#### Features

#### High corrosion resistant materials

Cast iron body, and stainless steel metal seal used in valve seat. NBR or FKM packing seal can be selected. Materials optimum for coolant are used.

#### Certain operation

Certain operation is enabled with external pilot air operated cylinder.

Water hammer prevented (Only 2 port valve)

Resistant to foreign matter A metal seal is used.

Usable in flammable

environment.

(Air operated type)



#### CONTENT

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<ul> <li>Product introduction</li> </ul>		706
Low pressure (0.5 MPa and 1.	0 MPa), 2 port valve	
<ul> <li>Air operated type</li> </ul>	CVE2, CVE22-05/10	708
<ul> <li>Solenoid valve mounted type</li> </ul>	CVSE2, CVSE22-05/10	708
Medium pressure (1.6 MPa an	nd 3.0 MPa), 2 port valve	
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<ul> <li>Solenoid valve mounted type</li> </ul>	CVSE2, CVSE22-16/30	718
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<ul> <li>Air operated type</li> </ul>	CVE2, CVE22-70	726
<ul> <li>Solenoid valve mounted type</li> </ul>	CVSE2, CVSE22-70	726
Medium/high pressure (3.5 MF	Pa and 7.0 MPa), 3 port va	lve
<ul> <li>Air operated type</li> </ul>	CVE3-35/70	732
<ul> <li>Solenoid valve mounted type</li> </ul>	CVSE3-35/70	732
Low pressure (0.3 MPa), 3 por	rt valve	
<ul> <li>Air operated type</li> </ul>	CV3E	744
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Always read the precautions in the Introduction and page 702 before starting use.

HNB/G

HSR/G

FAB/G FGB/G

FVB

FWB/G

FHB

FLB AR

AG

AD APK/ ADK

For dry air Explosion proof

HVR/ HVL SAR/ SVB

700

NP/NAP/ NVP CHB/G

MXB/G

Other G.P. systems

PD/FAD/ P.J

CVSE CPE/ CPD

Medica analysis Custom

order Coolant valve
Air operated 2, 3 port valve

# Series variation

# Air operated 2, 3 port valve (coolant control) (Coolant valve)

No of nort	,	Category		Model	Working pressure			
No. of port	,	Jaleg	ory	Modei	range MPa	Rc3/8	Rc1/2	
		ē	Air operated type	CVE2-***-05	0.40.0.5	•	•	
		essui	Solenoid valve mounted type	CVSE2-***-05	0 to 0.5	•	•	
		Low pressure	Air operated type	CVE2-***-10	0 to 1 0	•	•	
		3	Solenoid valve mounted type	CVSE2-***-10	0 to 1.0	•	•	
0		anre	Air operated type	CVE2-***-16	0 to 1 6	•	•	
2 port		Medium pressure	Solenoid valve mounted type	CVSE2-***-16	0 to 1.6	•	•	
		Air operated type CVE2-***-30	0.4- 0.0	•	•			
		Med	Solenoid valve mounted type	CVSE2-***-30	0 to 3.0	•	•	
	F	High pressure	Air operated type	CVE2-***-70	0.4- 7.0	•	•	
		High pr	Solenoid valve mounted type	CVSE2-***-70	0 to 7.0	•	•	
		Low pressure	Air operated type	CV3E-***-03	0.4- 0.0			
	45	Low pre	Solenoid valve mounted type	CVS3E-***-03	0 to 0.3			
2	_	Medium pressure	Air operated type	CVE3-***-35	0.4- 0.5	•	•	
3 port			Solenoid valve mounted type	CVSE3-***-35	0 to 3.5	•	•	
		High pressure	Air operated type	CVE3-***-70	0.4- 7.0	•	•	
		High pr	Solenoid valve mounted type	CVSE3-***-70	0 to 7.0	•	•	

USB/G FAB/G FGB/G FVB FWB/G FHB FLB AB AG AP/ AD APK/ ADK For dry air Explosion proof HVB/ HVL SAB/ SVB NP/NAP/ NVP CHB/G MXB/G Other G.P. systems PD/FAD/ PJ

CVE/ CVSE CPE/

CPD Medical analysis Custom

order Coolant valve Air operated 2, 3 port valve



# Safety precautions Always read this section before starting use.

# Air operated 2, 3 port valve (coolant valve) (CVE/CVSE)

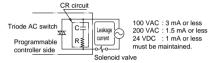
# **Design & Selection**

## 1. Safety designing

## **A CAUTION**

#### ■ Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



#### 2. Working fluid

# **AWARNING**

#### ■ Working fluid

The compatibility has not been evaluated with all coolants. Particularly, if coolant contains high levels of chlorine or sulfur, materials used at wetted parts could be adversely affected. Confirm the compatibility when making a selection. Non-corrosive fluids refer to fluids that do not affect or are not affected when they contact the valve's wetted part materials.

Wetted part materials: cast iron (nickel plating), stainless steel, nitrile rubber or fluoro rubber, and epoxy resin adhesive.

#### ■ External pilot air

(1) Drainage measures - Compressed air contains high levels of drainage (water, oxidized oil, tar, foreign matter) that can significantly reduce the reliability of pneumatic components. As measures against drain, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.

- (2) Pre-lubrication This series is pre-lubricated, so no lubricator is required. However, once lubrication has been started, it must be continued so that the lubricant is not used up. For lubrication, use the turbine oil Class 1 ISO VG32 (#90) or equivalent
- (3) Filter Install a filter with a 5 µm or less filter element.

#### 3. Working environment

#### **AWARNING**

- CVSE Series cannot be used in an explosive gas atmosphere. When using in an explosive gas atmosphere, change to the CVE Series, and provide a separate explosion proof solenoid valve on the pilot air circuit.
- If there are high levels of dust in the area, install a downwardfacing silencer or elbow joint on the exhaust port so that dust does not enter.
- When using in a place where water splashes on the valve, take appropriate measures to protect it.

# 4. How to use

# A CAUTION

Pilot air pressure

Use pilot air pressure in accordance with the specifications.

# Installation & Adjustment

# 1. Pipina

#### A CAUTION

■ Do not pipe using the solenoid valve section. There is a risk of damage. (For solenoid valve mounted type)

■ When piping the CVE or CVSE Series, pay attention to the supply ports on the unit and pilot operation sides.

Model no.	Unit side supply port	Pilot operation side supply port
CVE2		X
CVE22		Υ
CVSE2/CVSE22	IN	Р
CVE3		Υ
CVSE3		Р

Note: Pipe the unit side supply port so that the arrow on the body matches the fluid flow direction. If supplied in reverse, internal components could be damaged when the valve operates.

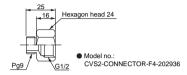
# CVE/CVSE Series

#### Individual precautions

2. Wiring

# **A CAUTION**

- Wiring of solenoid valve mounted type
  - (1) Refer to connections in pages 54 to 55 in the Introduction when wiring to a DIN terminal box or T type terminal box.
  - (2) The size of the screw for the junction box outlets of the DIN terminal box can be changed from Pg9 to G1/2 using the optional connector below.



(3) Coil direction can be changed 180°. To reverse the electrical connection direction, rotate only the coil. Do not lose internal parts when removing the coil.

# During Use & Maintenance

# 1. Maintenance & inspection

# **ACAUTION**

- Pilot air pressure Use pilot air pressure in accordance with the specifications.
- If water hammer occurs when a 3 port coolant valve for medium/high pressure operates, reduce the noise as follows.
  - (1) Install a metering valve on the valve IN side, then adjust the metering valve to reach the required flow. If these countermeasures fail, contact CKD.

# 2. Assembling & disassembling

# **AWARNING**

■ A spring is used in the cylinder cover. When disassembling this type, the spring could pop out and cause injuries, so take care.

The NC (normally closed) type 2 port valve has a snap ring to prevent the spring from popping out. Do not remove the snap ring.

HNB/G

HSR/G

FAB/G

FGB/G FV/R

FWB/G

FHB FLB

AR

AG

AD APK/ ADK

For dry air

Explosion

proof HVR/

HVL SAR/ SVB

NP/NAP/ NVP

CHB/G

MXB/G

Other G.P. systems

PD/FAD/ P.J

CVE/ CVSE

CPE/ CPD

> Medical analysis Custom

order

# CVE/CVSE Series

#### Assembling pilot solenoid valve (for solenoid valve mounted type)

If the pilot solenoid valve has been disassembled, assemble it as follows.

#### (1) Coil side

#### Disassembling

Loosen the cross headed pan head machine screw, and lift up the coil assembly.

The outer spring, plunger assembly and O ring can be removed.

Reassembling

Set the parts in the sequence of the O ring, plunger assembly, outer spring and coil assembly.

Tighten the cross headed pan head machine screw with a torque of 0.7 to 1.1 N·m.

#### (2) Cover side

#### Disassembling

Loosen the flat headed cross cut screw, and remove the cover. The valving element spring, valving element guide assembly and O ring can be removed.

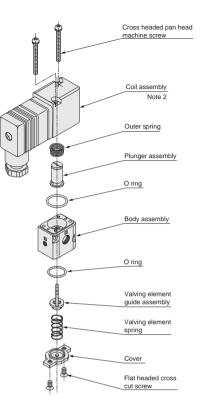
Reassembling

Set the parts in the sequence of the O ring, valving element guide assembly, valving element spring and cover. Tighten the flat headed cross cut screw with a torque of 0.7 to 1.1 N·m.

Note 1: Do not lose the components such as springs during disassembly.

Note 2: The coil assembly direction can be changed 180°. Loosen the cross headed pan head machine screw to change the direction.

Note 3: Turbine oil is applied to the plunger as a lubricant.



#### ■ Model no. of pilot solenoid valve (actuator assembly kit) for CVSE

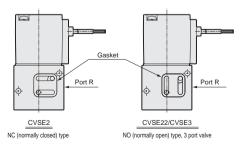
CVSE2-ACTUATOR-0 Rated voltage

Note 1: Indicate the coil option symbol in field \*1.

Note 2: Consult with your CKD Sales Representative about the solenoid valve (actuator assembly kit) for CVS3E.

#### Gasket direction (for solenoid valve mounted type)

The gasket has an orientation. Check the orientation when reassembling.





Air operated 2 port valve for high pressure (coolant valve)

# VSE22-70 Series E22-70 Series

- NC (normally closed) type, NO (normally open) type
- Port size: Rc3/8 to Rc1
- High pressure 7.0 MPa



#### JIS symbol

 CVE2 (air operated type) : NC type

 CVE22 (air operated type) : NO type



 CVSE2 (solenoid valve mounted type) : NC type



 CVSE22 (solenoid valve mounted type) : NO type



#### Common specifications

Model no.	CVE2/CVSE2	CVE22/CVSE22			
Actuation	NC (normally closed) type	NO (normally open) type			
Working fluid	Coolant, other no	n-corrosive fluids (*1)			
Fluid viscosity mm <sup>2</sup>	500 c	or less			
Working pressure range MI	0 to 7.0				
Withstanding pressure (water) MI	1	4			
Fluid temperature	-10 to 60 (r	no freezing)			
Ambient temperature	-10 1	to 60			
Valve seat leakage cm <sup>3</sup> /m	. 20 or les	s (water)			
Mounting attitude	Fr	ee			
Pilot air pressure MI	0.25	to 0.7			

<sup>\*1:</sup> Fluids that do not affect cast iron (nickel plating), stainless steel, copper, nitrile rubber or fluoro rubber

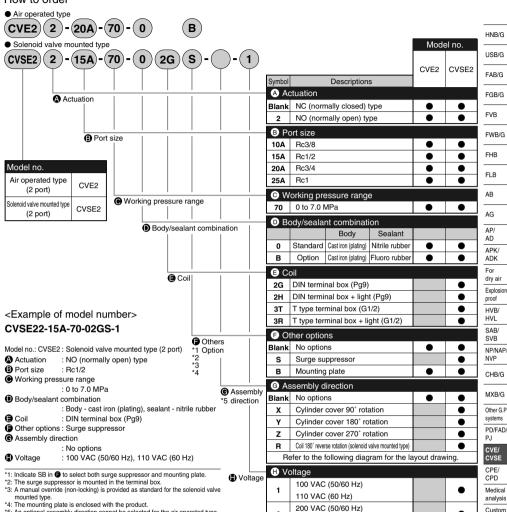
Electric specifications (solenoid valve mounted type common specifications)										
Rated voltage (*2) 100 VAC (50/60 Hz), 110 VAC (60 Hz); 200 VAC (50/60 Hz), 220 VAC (60 Hz); 24 V										
Apparent power	Holding	3.6 (50 Hz),	2.8 (60 Hz)							
(VA)	, 9 (60 Hz)									
Power consumption	on AC 1.9 (50 Hz), 1.5 (60 Hz)									
(W)	DC	2	.0							
Heat proof class		E	3							
Protective structure		DIN terminal box (Pg9) IPX5								
(IEC standards 529) T type terminal box (G1/2) IPX5										

<sup>\*2:</sup> Allowable voltage range must be within ±10% of the rated voltage.

#### Individual specifications for 7.0 MPa

Item	Dt	Orifice	Cv flow	Pilot	Weigl	nt (kg)
Model no.	Port size	(mm)	factor	port size	1.4 2.4 2 3.9 4	CVSE2(2)
CVE2(2)/CVSE2(2)-10A-70	Rc3/8	6.5	1.7		1.4	1.5
CVE2(2)/CVSE2(2)-15A-70	Rc1/2	8	2.8	D-1/0	2.4	2.5
CVE2(2)/CVSE2(2)-20A-70	Rc3/4	10.5	4.7	Rc1/8	3.9	4.0
CVE2(2)/CVSE2(2)-25A-70	Rc1	13	7.0		6.1	6.2

#### How to order



# G Assembly direction

facing right.

\*5: An optional assembly direction cannot be selected for the air operated type.

\*6: Clockwise rotation angles are shown as viewed from above with IN port

CVSE	2 (solenoid valve mount	ed type) *6			
Symbol	Blank (standard)	X Y		Z	R
Direction	Without rotation	Cylinder cover 90° rotation	Cylinder cover 180° rotation	Cylinder cover 270° rotation	Coil reverse rotation
	<b></b>	<b>\</b>	<b></b>	<b></b>	<b>\</b>
Arrangement			•		

2

3

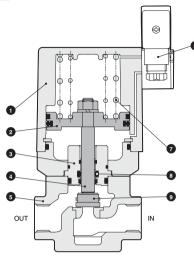
220 VAC (60 Hz)

24 VDC

Custom order Soolant valve for high pressure Air operated 2 port valve

# Internal structure and parts list

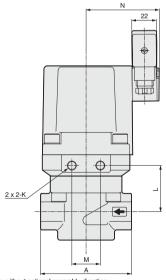
#### ● CVSE2

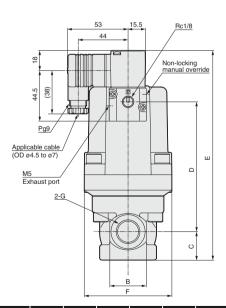


No.	Parts name	Material	
INO.			
1	Cylinder cover	ADC12	Aluminum die casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Piston rod	SUS304	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	Pilot solenoid valve	-	-
7	Spring	SWP	Piano wire
8	Rod packing seal	NBR (FKM)	Nitrile rubber (fluoro rubber)
9	Main valving element	SUS420J2	Stainless steel

#### **Dimensions**

DIN terminal box (Pg9) CVSE2/CVSE22-10A~25A-70-\*2G



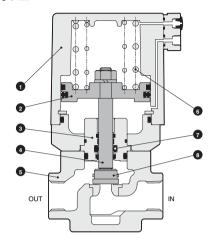


\* Shown without optional assembly direction.

Model no.	Α	В	С	D	E	F	G	K	L	М	N
CVSE2/CVSE22-10A-70-*2G	60	28	22	92.5	159.5	63	Rc3/8	M6 thread length 9	38	20	57.5
CVSE2/CVSE22-15A-70-*2G	80	32	25	114	184	77	Rc1/2	M8 thread length 10	40.5	25	64.5
CVSE2/CVSE22-20A-70-*2G	90	40	29	136.5	210.5	95	Rc3/4	M8 thread length 10	45.5	25	72.5
CVSE2/CVSE22-25A-70-*2G	110	48	33.5	149.5	228	113	Rc1	M12 thread length 14	49	45	82.5

# Internal structure and parts list

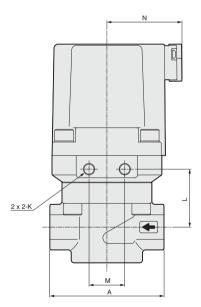
#### ● CVE2

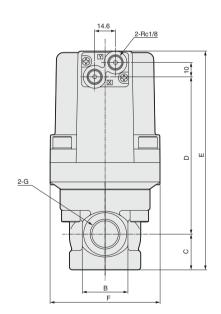


No.	Parts name	Material	
1	Cylinder cover	ADC12	Aluminum die casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Piston rod	SUS304	Stainless steel
5	Body	FCD450	Cast iron (plating
6	Spring	SWP	Piano wire
7	Rod packing seal	NBR (FKM)	Nitrile rubber (fluoro rubber
8	Main valving element	SUS420J2	Stainless steel

#### **Dimensions**

CVE2/CVE22-10A to 25A-70-\*\*





\* The pilot pressurization port is port X for the NC type and port Y for the NO type.

Model no.	Α	В	С	D	Е	F	G	K	L	М	N
CVE2/CVE22-10A-70-*	60	28	22	88.5	128.5	63	Rc3/8	M6 thread length 9	38	20	46
CVE2/CVE22-15A-70-*	80	32	25	110	153	77	Rc1/2	M8 thread length 10	40.5	25	53
CVE2/CVE22-20A-70-*	90	40	29	132.5	179.5	95	Rc3/4	M8 thread length 10	45.5	25	61
CVE2/CVE22-25A-70-*	110	48	33.5	145.5	197	113	Rc1	M12 thread length 14	49	45	71

HNB/G USB/G

FAB/G FGB/G

FVB

FWB/G

FHB

FLB AB

AG

AP/ AD APK/ ADK

For dry air Explosion

proof HVB/ HVL SAB/ SVB

NP/NAP/ NVP

CHB/G MXB/G

Other G.P. systems PD/FAD/

PJ CVE/ CVSE

CPE/ CPD Medical

analysis Custom order

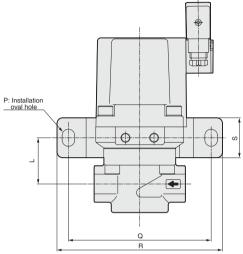
Coolant valve for high pressure Air operated 2 port valve

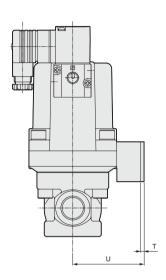
# CVE2/CVSE2-70 Series

# Optional dimensions

# Mounting plate

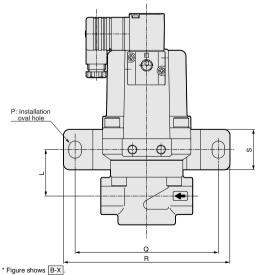
CVE2/CVE22 CVE2/CVE22 -10A to 25A-70-\*\*B/B-R/B-Y

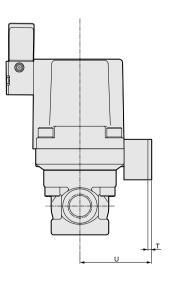




- \* Figure shows B
- Mounting plate

CVE2/CVE22 -10A to 25A-70-\*\* B-X / B-Z CVE2/CVE22





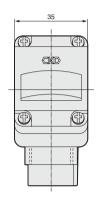
Model no.	L	Р	Q	R	S	Т	U
CV*E2*-10A-70-*B	38	9 x 12	85	100	25	3.2	45
CV*E2*-15A-70-*B	40.5	11 x 15	125	145	35	3.2	62.5
CV*E2*-20A-70-*B	45.5	11 x 15	125	145	35	3.2	71.5
CV*E2*-25A-70-*B	49	14 x 20	160	190	40	4	84

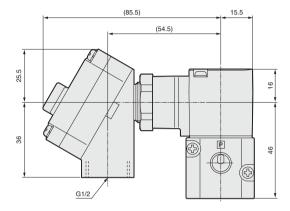
# CVE2/CVSE2-70 Series

Optional dimensions

## Optional dimensions

T type terminal box (G1/2) T type terminal box with light (G1/2) CVSE2/CVSE22-\*-70-\* 3T 3R





HNB/G

USB/G

FAB/G

FGB/G FVB

FWB/G

FHB FLB

AB

AG AP/

AD APK/ ADK

For dry air Explosion proof

HVB/ HVL SAB/ SVB

NP/NAP/ NVP

CHB/G

MXB/G Other G.P.

systems PD/FAD/

PJ CVE/ CVSE

CPE/ CPD

Medical analysis Custom

order Coolant valve for high pressure Air operated 2 port valve

# CVE/CVSE Series

# Electronic Catalog file list

# Air operated 2, 3 port valve (coolant control) (coolant valve)

Air operated 2 port valve for low pressure (pages 714 to 716)

Electronic Catalog file list is applied to "CAD DATA 2006".

Model no	DXF		MICRO CADAM
Model no.	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
CVE2/22-10A-5/10	CVE2	cve2_22_10a_5_10	CKD-CVE2/22-10A-5/10
CVE2/22-15A-5/10		cve2_22_15a_5_10	CKD-CVE2/22-15A-5/10
CVE2/22-20A-5/10		cve2_22_20a_5_10	CKD-CVE2/22-20A-5/10
CVE2/22-25A-5/10		cve2_22_25a_5_10	CKD-CVE2/22-25A-5/10
CVE2/22-32A-5/10		cve2_22_32a_5_10	CKD-CVE2/22-32A-5/10
CVE2/22-32F-5/10		cve2_22_32f_5_10	CKD-CVE2/22-32F-5/10
CVE2/22-40A-5/10		cve2_22_40a_5_10	CKD-CVE2/22-40A-5/10
CVE2/22-40F-5/10		cve2_22_40f_5_10	CKD-CVE2/22-40F-5/10
CVE2/22-50A-5/10		cve2_22_50a_5_10	CKD-CVE2/22-50A-5/10
CVE2/22-50F-5/10		cve2_22_50f_5_10	CKD-CVE2/22-50F-5/10
CVE2/22-65F-5/10		cve2_22_65f_5_10	CKD-CVE2/22-65F-5/10
CVE2/22-80F-5/10		cve2_22_80f_5_10	CKD-CVE2/22-80F-5/10
Option and accessory (mounting plate)		cve2_f	CKD-CVE2-F

2 port valve for low pressure with solenoid valve (pages 712, 713, 716) Electronic Catalog file list is applied to "CAD DATA 2006".

	Electronic Catalog file list is applied to CAD DATA 2006			
Model no.		DXF	MICRO CADAM	
Wodel Ho.	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)	
CVSE2/22-10A-5/10	CVSE2	cvse2_22_10a_5_10	CKD-CVSE2/22-10A-5/10	
CVSE2/22-15A-5/10		cvse2_22_15a_5_10	CKD-CVSE2/22-15A-5/10	
CVSE2/22-20A-5/10		cvse2_22_20a_5_10	CKD-CVSE2/22-20A-5/10	
CVSE2/22-25A-5/10		cvse2_22_25a_5_10	CKD-CVSE2/22-25A-5/10	
CVSE2/22-32A-5/10		cvse2_22_32a_5_10	CKD-CVSE2/22-32A-5/10	
CVSE2/22-32F-5/10		cvse2_22_32f_5_10	CKD-CVSE2/22-32F-5/10	
CVSE2/22-40A-5/10		cvse2_22_40a_5_10	CKD-CVSE2/22-40A-5/10	
CVSE2/22-40F-5/10		cvse2_22_40f_5_10	CKD-CVSE2/22-40F-5/10	
CVSE2/22-50A-5/10		cvse2_22_50a_5_10	CKD-CVSE2/22-50A-5/10	
CVSE2/22-50F-5/10		cvse2_22_50f_5_10	CKD-CVSE2/22-50F-5/10	
CVSE2/22-65F-5/10		cvse2_22_65f_5_10	CKD-CVSE2/22-65F-5/10	
CVSE2/22-80F-5/10		cvse2_22_80f_5_10	CKD-CVSE2/22-80F-5/10	
Ontion and accessory (T type terminal box, mounting plate)		cvse2 f	CKD-CVSE2-F	



# Electronic Catalog file list

# Air operated 3 port valve (coolant control) (coolant valve)

3 port valve for low pressure (page 745)

Electronic	Catalaa	file liet is	applied to	"CAD	DATA	2006"
Electronic	Catalog	lile list is	applied to	CAD	DATA	2006.

	Model no.	DXF		MICRO CADAM
		Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
	CV3E-20A-3	CV3E	cv3e_20a_3	CKD-CV3E-20A-3
	CV3E-25A-3		cv3e_25a_3	CKD-CV3E-25A-3
	CVS3E-20A-3		cvs3e_20a_3	CKD-CVS3E-20A-3
	CVS3E-25A-3		cvs3e_25a_3	CKD-CVS3E-25A-3
	Option and accessory (T type terminal box, mounting plate)		cv_e_f	CKD-CV*E-F
	Accessory (T type terminal box, T type terminal box + light)		cvs2_f	CKD-CVS2-F

HNB/G

USB/G FAB/G

FGB/G FVB

FWB/G

FHB FLB

AB

AG

AD APK/ ADK

For dry air Explosion

proof HVB/ HVL SAB/ SVB

NP/NAP/ NVP

CHB/G

MXB/G Other G.P.

PD/FAD/

CVE/ CVSE

CPE/ CPD

Medical analysis Custom

order