# Custom order Medical analysis process components

# Medical analysis process components

#### Overview

In recent years, medicine has greatly advanced and medical engineering has become a great priority. These advances have increased the need for highly functional, performing and accurate biomedical inspections and devices in clinical medicine.

To answer these advanced needs for medical analysis process components, CKD has set the following six target items for medical technology, and has prepared special specification control valves to match these targets. Select the component that matches your needs.

#### **Features**

#### Compact and lightweight

The components have been downsized and lightened to handle changes from centralized medicine to portable medicine.

#### Low noise

In consideration of hospital environments, the valves function with an extremely quiet drive.

#### Minimal residue

The fluid accumulation and fluid residue have been minimized to allow for the fluid accuracy and safety in various inspections.

#### Maintenance-free

The life of the parts has been increased, and a maintenance-free design has been incorporated to improve the reliability of the devices.

#### High sealing performance High corrosion resistant materials

and a high sealing structure have been incorporated to ensure the purity of inspection fluids.

#### Wide variation

A variety of models are available to match a diverse range of reagents and inspection fluids.

For water, pure water, chemical liquids (fluids that do not corrode materials at wetted parts)



Series variation	76
▲ Safety precautions	76
Compact metal free for chemical liquid	
2, 3 port solenoid valve	
● MR10	77:
● MAB1/MAG1	77
● MYB1/MYG1	779
● MYB2/MYG2	78
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● MEB2/MEG2	78
● Lever type HMTB1/HMTG1	80
2 port solenoid valve	
● MJB3	79
● EMB21	79
● EMB41/51	79
● M	79
High corrosion resistant	
2, 3 port valve UMB1/UMG1	80
● 2 port valve HB	80
Pinch valve	
2, 3 port valve HYN	81

Always read the precautions in the Introduction and page 768 before starting use.

CAD Electronic Catalog file list

HNB/G

HSR/G FAB/G

FGB/G

FVR

FWB/G FHB

FLB

AR AG

AD APK/

ADK For dry air Explosion

proof HVR/ HVL CAR/ SVB

NP/NAP/ NVP

CHR/G

MXB/G Other G.P. systems

PD/FAD/ P.J CVE/ CVSE

CPE/ CPD

analysis

813

# Series variation

					Mat	erial			Fluid			
			Model	No. of port	Sealant	Body	Pure water	Physiological brine	Reagent	Waste liquid	Cleaning liquid	
			MR10	2, 3	FKM	PEEK	•	•	•	•	•	
			MAB1	2	PTFE	PTFE	•	•	•	•	•	
			MAG1	3	PTFE	PTFE	•	•	•	•	•	
			MYB1	2	FKM	PPS	•	•	•	•	•	
			MYG1	3	FKM	PPS	•	•	•	•	•	
	ص		MYB2	2	FKM	PPS	•	•	•	•	•	
	l liqui		MYG2	3	FKM	PPS	•	•	•	•	•	
	mica	type	МҮВ3	2	FKM	PPS	•	•	•	•	•	
	r che	ragm	MYG3	3	FKM	PPS	•	•	•	•	•	
e e	ree fo	Diaphragm type	MEB2	2	PTFE FKM	PPS	•	•	•	•	•	
Solenoid valve	Metal free for chemical liquid		MEG2	3	PTFE FKM	PPS	•	•	•	•	•	
lenoi	Σ		MJB3	2	Silicon rubber	PSU	•	•	•	•	•	
SS			EMB21	2	PTFE	SUS316 PTFE	•	•	•	•	•	
			EMB41/51	2	PTFE	PTFE	•	•	•	•	•	
			М	2	PTFE FKM	PTFE PVC	•			•		
		Lever	HMTB1	2	NBR	PPS	•	•	•		•	
		ĘĘ	HMTG1	3	FKM EPDM	FFS	•	•	•		•	
	stant		USB2/3	2	NBR FKM	PPS	•					
	resis	ype	USG2/3	3	NBR FKM	PPS	•					
	osion	Poppet type	UMB1	2	FKM	SUS304 or equiv.	•					
	High corrosion resistant	Рос	UMG1	3	FKM	SUS304 or equiv.	•					
	High		НВ	2	NBR (FKM) (PTFE)	SUS316	•					
Pinch valve	Metal type	free	HYN	2, 3	-	-	•	•	•	•	•	

Note: Check the compatibility between working fluid and body/sealant materials when selecting.

	Orifice (ø/mm)																	
Page	15	12	10	8	7	6	5	4	3.2	3	2.3	2	1.6	1.5	1	0.9	0.5	
772															•			
776													1.6 or equiv.					
776													1.6 or equiv.					
779												2.0 or equiv.						
779												2.0 or equiv.						
782										3.0 or equiv.								
782										3.0 or equiv.								
785							5.0 or equiv.											
785							5.0 or equiv.											
788										3.0 or equiv.								
788										3.0 or equiv.								
791										•								
793										•								
795	•	•	•	•		•												
798		•	•	•		•		•				•						
802													•					
802													•					
16											•		•	•	•			
16													•	•	•			
805																•		
805																•		
807					•			•	•	•	•		•	•	•			
811						Tube ID				Tube ID					Tube ID		Tube ID	



# Safety precautions Always read this section before starting use.

# Medical analysis process components

# **Design & Selection**

# **WARNING**

#### 1 Working environment

When using in a place where water splashes on the valve, take appropriate measures to protect it.

# CAUTION

- (1) Working fluids must not adhere to the product body.
- (2) Carefully select the solenoid valve taking the chemical liquid characteristics into consideration. (Presence of crystal deposits when chemical liquids dry, effect to solenoid valve component materials if chemical liquids evaporate, etc.)
- (3) When using these components for a chemical liquid having a low boiling point, such as hexane, the chemical liquid in the solenoid valve could evaporate due to heating of the coils, and cause bubbles, etc. in the solenoid valve and pipe. Use an AMD type air operated valve for chemical liquid if formation of bubbles, etc. poses a problem.
- (4) When using the solenoid valve with a negative pressure, such as for dispensing control, air may be sucked into the solenoid valve depending on the type of chemical liquid, type of connection joint, and type of tube, etc. Check the state carefully before starting use.

# Installation, Piping & Wiring

# A CAUTION

1 Tighten the piping with the following torques. Note that if the solenoid valve body is made of resin, a resin joint must be used. The port could be damaged if a metal joint is used.

<<Stainless steel body solenoid valve>> <<Polyvinyl chloride body solenoid valve>>

Nominal pipe diameter	Tightening torque [N·m]									
M5	2.1 to 3									
Rc1/8	18 to 20									
Rc1/4	23 to 25									
Rc3/8	31 to 33									

١	Vominal pipe diameter	Tightening torque [N·m]
	R3/8	1.5 to 2.0
	R1/2	2.0 to 2.5
	R3/4	2.5 to 3.0
_		

<<Fluorine resin body solenoid valve>> <<PPS/PEEK body solenoid valve>>

Nominal pipe diameter	Tightening torque [N·m]						
M6	0.05 to 0.08						
Rc1/4	0.7 to 1.0						
Rc3/8, R3/8	1.0 to 1.5						
Rc1/2, R1/2	1.5 to 2.0						
R3/4	2.0 to 2.5						

VIII O/I LLIVI	Jody Joichold Valve>>
Nominal pipe diameter	Tightening torque [N·m]
M5, M6	0.10 to 0.15
Rc1/8	0.5 to 0.8
Rc1/4	1.0 to 1.5
Rc3/8	1.0 to 1.5

#### << Precautions for each model>>

# Safety Precautions for MR10

# A CAUTION

- (1) Before starting use, check the compatibility between the materials of the product and working fluid.
- (2) Do not use for hydrochloric acid, hydrofluoric acid, nitric acid or sodium hypochlorite (soda).
- (3) Foreign matter etc. inside the piping may cause malfunction and valve seat leakage. Make sure to flush the piping.
- (4) When standing the secondary piping, do not make it higher than 2 m. Use tubing or piping with the same or larger bore size as the orifice to fix the pipe.
- (5) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.

# Safety Precautions for MAB1/MAG1

# CAUTION

- (1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.
- (2) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.
- (3) Consult with CKD if the secondary piping is laid at a high level or extremely restricted.
- (4) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.

#### Safety Precautions for MYB 1/MYG 1/MEB2/MEG2

# A CAUTION

- (1) Before starting use, check the compatibility between the materials of the product and working fluid. Working fluids must not adhere to the product body.
- (2) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.
- (3) Do not use metal joints because they could damage the port. Use a PP or fluorine resin joint. Tighten the joint with the recommended tightening torque shown in the table.

- (4) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.
- (5) Current leakage from the control circuit must be less than that specified for each voltage.
- (6) Consult with CKD if the secondary piping is laid at a high level (2 m or higher) or extremely restricted.
- (7) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.

# **Safety Precautions for MJB3**

# **A** CAUTION

- Before starting use, check the compatibility between the materials of the product and working fluid.
   Working fluids must not adhere to the product body.
- (2) Foreign matter etc. inside the piping may cause malfunction and valve seat leakage. Always flush the piping before installing the valve.
- (3) Do not use for hydrochloric acid, hydrofluoric acid or nitric acid. Before using a permeable fluid, contact CKD. The fluid could permeate the diaphragm.
- (4) Consult with CKD if the secondary piping is laid at a high level (2 m or higher) or extremely restricted.
- (5) Do not apply excessive force on the joint when connecting or disconnecting the tube.
- connecting or disconnecting the tube.
  (6) Do not disassemble the product.

The required performance may not be satisfied even if a disassembled product is reassembled.

# **Safety Precautions for MB21**

# A CAUTION

- (1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks.
- Always flush the piping before installing the valve.

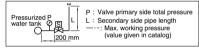
  (2) Consult with CKD if the secondary piping is laid at a high level.
- (3) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.
- (4) Do not disassemble the product.

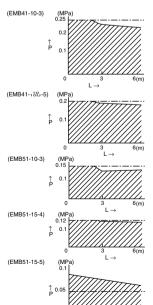
  The required performance may not be satisfied even if a disassembled product is reassembled.

# Safety Precautions for EMB41/EMB51

# **A** CAUTION

- (1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.
- (2) Use VCTF-0.75 (2-conductor: outer diameter 6.6) vinyl code for equipment (JISC3306) for the led out wires.
- (3) Use the PFA-10-8 for the EMB41-10U tube.
- (4) Consult with CKD if the secondary piping is laid at a high level.
- (5) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.
- (6) The working pressure changes particularly according to the OUT side piping conditions, so refer to the characteristics in the following graph before using (note that these characteristics are for water).







# Safety precautions Always read this section before starting use.

# Medical analysis process components

<< Precautions for each model>>

#### Safety Precautions for M

# **A** CAUTION

- (1) Oil is sealed inside, so do not disassemble the product.
- (2) This product is not oil free.
- (3) If the diaphragm is damaged during use, oil will flow into the fluid. Consider this when making a selection.
- (4) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.

#### Safety Precautions for HMTB/HMTG

# A CAUTION

- (1) Use a direct current power supply excluding rectified direct current.
- (2) Do not apply excessive force on the joint when connecting or disconnecting the tube.
- (3) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.
- (4) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.

#### Safety Precautions for UMB/UMG

# CAUTION

- (1) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.
- (2) Do not apply a torque exceeding 0.3 N·m on the mounting bolt (M3).
- (3) Protect the product against contact with water. Water could cause insulation or operation faults.
- (4) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.

# **Safety Precautions for HB**

# A CAUTION

- (1) Foreign matter etc. inside the piping may cause malfunction and valve seat leakage. Always flush the piping before installing the valve.
- (2) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.
- (3) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquid.

# Safety Precautions for HYN

# A CAUTION

- (1) The power supply voltage must be 24 VDC (average) with a ripple of 4.8 VP-P or less. (When using an average of 12 VDC, the ripple must be 2.4 VP-P or less.)
- (2) When using a DC-specification product with a full wave rectified AC power supply, the power must be smoothed to attain the forementioned ripple voltage range. Consult with CKD for more information.
- (3) Tighten the HYN-2/3 screw with a torque of 0.2 to 0.4 N·m, and the HYN-5/8 screw with a torque of 0.5 to 0.7 N·m.
  - (When the screw engagement length is 5 mm)
- (4) Securely insert the tube to the designated position.
- (5) The performance may not be satisfied if a tube other than the recommended ones is used.
- (6) Depending on the working fluid, the silicon tube may not be resistant to chemical liquids, or chemical liquids may adhere. Check this before
- (7) The DC specification product has polarity.  $(Red = \oplus)$
- (8) Do not disassemble the product. The required performance may not be satisfied even if a disassembled product is reassembled.
- (9) Do not apply water on the coils.

Direct acting 2, 3 port valve (pinch valve for high purity fluids)

# **HYN** Series

- NO (normally closed) type, NC (normally closed) type, universal type
- Working fluid: water, pure water, chemical liquids
- Tube mounting and removal method and applicable tube: ø2 x ø0.5, ø3 x ø1, ø5 x ø3, ø8 x ø6

# JIS symbol

2 port valve : NO (normally open) type



2 port valve : NC (normally closed) type



3 port valve : universal type



#### Common specifications

Item	HY	N-2	HY	N-3	HY	N-5	HYN-8					
iteiii	AC	DC	AC	DC	AC	DC	AC	DC				
Working fluid	Water, pur	e water, ch	emical liqu	ids (fluids tl	nat do not d	orrode mat	terials at w	etted parts)				
Working pressure range MPa	0	0 to 0.05 (refer to working pressure range in individual specifications.)										
Fluid temperature °C				5 to	50							
Ambient temperature °C		0 to 40 (no freezing)										
Frequency cycle/min.	60 or less											
Mounting attitude				Free	(*4)							
Electric specifications												
Rating	Continuous (*2)	Continuous (*2)	Continuous (*2)	Continuous (*2)	Intermittent (*3)	Continuous (*2)	Intermittent (*3)	Continuous (*2)				
Valtage	100 V	12 V	100 V	12 V	100 V	12 V	100 V	12 V				
Voltage	(50/60 Hz)	24 V	(50/60 Hz)	24 V	(50/60 Hz)	24 V	(50/60 Hz)	24 V				
Voltage fluctuation range			-10	to +10% o	f rated volt	age						
Leakage current mA				2 or	less							

\*1: Read the safety precautions for HYN (page 770).

\*2: Use at a cycle of ON for 0.5 seconds or more and OFF for 0.5 seconds or more.

\*3: Keep the intermittent rating at 10 minutes or less for maximum continuous energizing, and one half or less of the DUTY ratio.

\*4: Avoid vertical installation with the coil facing down.

\*5: Tighten the set screw with the recommended tightening torque below. Recommended tightening torque: HYN-2/3: 0.2 to 0.4 N·m, HYN-5/8: 0.5 to 0.7 N·m

\*6: The performance may not be satisfied if a tube other than the recommended ones is used.

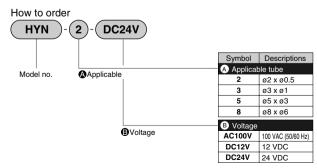
\*7: Do not disassemble the product.

#### Individual specifications

Item	Applicable tube (*8)	Working pressure range	Power consumption	n 12/24 VDC (W)	Max. ampere	100 VAC (A)	Inculation class	Weight (kg)	
Model no.	(silicon tube)				Suction (0.2s)		Ilibulation class		
HYN-2	ø2 x ø0.5		3.6	3.6	0.06	0.06	Class B	0.12	
HYN-3	ø3 x ø1	0 to 0.05	15	4	0.26	0.06	Class E	0.18	
HYN-5	ø5 x ø3		30	8	0.55	0.14	Class B	0.36	
HYN-8	ø8 x ø6			0.55	0.14	Class D	0.37		

<sup>\*8:</sup> Use the following recommended applicable tubes.

Model of tube	Tube size (OD) x (ID) x (length)
HYN-2-0.5-1000	ø2 x ø0.5 x 1 m
HYN-2-0.5-5000	ø2 x ø0.5 x 5 m
HYN-3-1-1000	ø3 x ø1 x 1 m
HYN-3-1-5000	ø3 x ø1 x 5 m
HYN-5-3-1000	ø5 x ø3 x 1 m
HYN-5-3-5000	ø5 x ø3 x 5 m
HYN-8-6-1000	ø8 x ø6 x 1 m
HYN-8-6-5000	ø8 x ø6 x 5 m



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

SVB NP/NAP/ NVP CHR/G

SAB/

MXB/G Other G.P. systems

PD/FAD/ P.J CVE/ CVSE CPE/

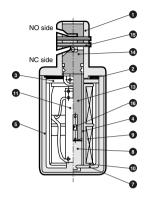
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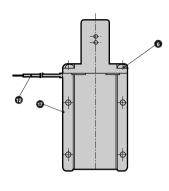
order

Medical analysis process components Pinch valve

# Internal structure and parts list

# ● HYN



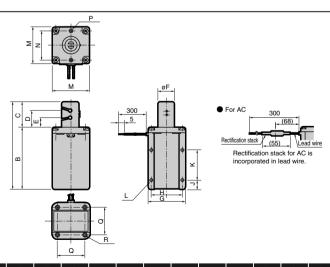


No.	Parts name	Material		No.	Parts name	Material			
1	Valve A	POM	Acetal resin	10	Bobbin	PET	Polyethylene		
2	Packing seal	NBR	Nitrile rubber	11	Electric components assembly		<u> </u>		
3	Frame B	SPC	Steel	12	Lead wire	UL1430 AWG26	<u> </u>		
4	Plunger guide	C2700	Copper	13	Plunger	SUS405	Stainless steel		
5	Cover	PA	Polyamide	14	Valve B	POM	Polyacetal resin		
6	Tapping screw	SUS304	Stainless steel	15	Spring pin	SUS420	Stainless steel		
7	Frame A	SPC	Steel	16	Recovery spring	SUS304	Stainless steel		
8	Stopper	SUS405	Stainless steel	17	Name plate		i —		
9	Coil						1		

#### Dimensions



• HYN



Model no.	Α	В	С	D	E	F	G	Н	J	K	L	М	N	Р	Q	R
HYN-2	72.9	52.9	20	14.1	8.5	14	30	24	8	24	4-M3 depth 7	30	24	2-M3 depth 5	-	_
HYN-3	81.5	57.5	24	17	10	16	34	28	9	28	4-M3 depth 7	34	28	2-M3 depth 5	-	_
HYN-5	98	65	33	23	13	25	43	36.5	11	36.5	4-M4 depth 7	43	_	_	36.5	4-M4 depth 7
HYN-8	103	65	38	27	14	30	43	36.5	11	36.5	4-M4 depth 7	43	-	_	36.5	4-M4 depth 7

# Medical analysis process components

Electronic Catalog file list

# Medical analysis process components

Compact metal free 2, 3 port solenoid valve for chemical liquid

Compact metal free 2, 3 port solenoid valve for chemical liquid Electronic Catalog file list is applied to "CAD DATA 2006".						
Model no.		DXF	MICRO CADAM			
IVIOGEI IIO.	Folder nar	ne Filename	Filename (GROUP: CAD, USER: STE	DLIB) USB/G		
MAB1/MAG1: Page 778				FAB/G		
MAB1-M6	MA_	mab1_m6	CKD-MAB1-M6	FAB/G		
MAG1-M6		mag1_m6	CKD-MAG1-M6	FGB/G		
MYB1/MYG1: Page 781						
MYB1	MY_	myb1	CKD-MYB1	FVB		
MYG1		myg1	CKD-MYG1			
● MYB2/MYG2: Page 784						
MYB2-6	MY_2	myb2_6	CKD-MYB2-6			
MYG2-6		myg2_6	CKD-MYG2-6	FHB		
■ MYB3/MYG3: Page 787				FLB		
MYB3-6-AC	MY_	myb3_6_ac	CKD-MYB3-6-AC			
MYB3-8-AC		myb3_8_ac	CKD-MYB3-8-AC	AB		
MYB3-10-AC		myb3_10_ac	CKD-MYB3-10-AC			
MYB3-6-DC		myb3_6_dc	CKD-MYB3-6-DC	AG		
MYB3-8-DC		myb3_8_dc	CKD-MYB3-8-DC	AP/		
MYB3-10-DC		myb3_10_dc	CKD-MYB3-10-DC	AD		
MYG3-6-AC		myg3_6_ac	CKD-MYG3-6-AC	APK/		
MYG3-8-AC		myg3_8_ac	CKD-MYG3-8-AC	ADK		
MYG3-10-AC		myg3_10_ac	CKD-MYG3-10-AC	For		
MYG3-6-DC		myg3_6_dc	CKD-MYG3-6-DC	dry air		
MYG3-8-DC		myg3_8_dc	CKD-MYG3-8-DC	Explosion proof		
MYG3-10-DC		myg3_10_dc	CKD-MYG3-10-DC	HVB/		
MEB2/MEG2: Page 790	,			HVL		
MEB2-6	ME_2	meb2_6	CKD-MEB2-6	SAB/		
MEG2-6		meg2_6	CKD-MEG2-6	SVB		
Lever type HMTB1/HMTG1: Pa	ge 804			NP/NAP/		
HMTB1	HMTB	hmtb1	CKD-HMTB1	NVP		
HMTG1	HMTG	hmtg1	CKD-HMTG1	CHB/G		
● MJB3: Page 792						
MJB3-4TN	MJB3	mjb3_4tn	CKD-MJB3-4TN	MXB/G		

# High corrosion resistant

Model no.	DXF		MICRO CADAM				
Model no.	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)				
● 2, 3 port valve UMB1/UMG1: Page 806							
UMB-T1	UMB_UMG	umb_t1	CKD-UMB-T1				
UMG-T1		umg_t1	CKD-UMG-T1				
2 port valve HB: Page 810							
HB11	НВ	hb11	CKD-HB11				
HB21		hb21	CKD-HB21				
HB31-6(8)		hb31_6_8	CKD-HB31-6(8)				
HB41-8-5		hb41_8_5	CKD-HB41-8-5				
HB41-8(10)		hb41_8_10	CKD-HB41-8(10)				

#### Pinch valve (page 812)

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
HYN-2	HYN	hyn_2	CKD-HYN-2
HYN-3		hyn_3	CKD-HYN-3
HYN-5		hyn_5	CKD-HYN-5
HYN-8		hyn_8	CKD-HYN-8

Other G.P.

PD/FAD/ PJ CVE/ CVSE CPE/ CPD