

DC THYRISTOR CONVERTERS



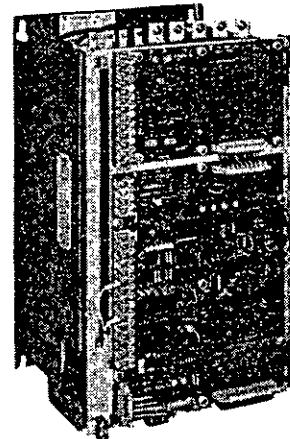
For Varispeed[®] 505MT DRIVE
(SPINDLE DRIVE OF MACHINE TOOLS)

C 715


ETD-E-9009E

January 1980


Control Unit (VS-505MT) is produced for spindle drive of machine tools. Based on many year's experience of Yaskawa's variable speed drive, the Control Unit is designed to be satisfied total functions required for spindle drive.



■ RATINGS

VS-505 MT			Motor Application				Overload
Type CDMR-MR- 	Rated Output Current (A)	Rated Output Voltage (V)	Rated Output (kw)		Rated Current (A)		
			Cont.	30 min.	Cont.	30 min.	
5.5k	34	220	3.7	5.5	20	32	120% of rated short-time current for 60 sec.
7.5k	44		5.5	7.5	30	42	
11k	63		7.5	11	39	60	
15k	86		11	15	58	82	
22k	128		15	22	78	122	
26k	143		18.5	26	95	136	
30k	164		22	30	112	156	
37k	210		30	37	158	200	
45k	243		37	45	190	231	

■ POWER SOURCE

Item		Specifications								
Type CDMR-MR- 		5.5k	7.5k	11k	15k	22k	26k	30k	37k	45k
Power source Capacity (kvA)	Continuous	9	12	15	21	27	33	38	52	62
	30 min.	13	16	22	29	41	45	52	65	75
Input Supply Voltage		220V...220V $\pm 10\%$ / -15% 50/60 Hz, 240V $\pm 5\%$ / -20% 50Hz								
Allowable Voltage Fluctuation		200V...200V $\pm 10\%$ 50/60 Hz,								
Frequency										
Allowable Frequency Fluctuation		$\pm 3\%$ or less								

YASKAWA Electric Mfg. Co., Ltd./Japan

■ GENERAL SPECIFICATIONS

Item	Specifications
Control Specifications	Main Circuit Connection • 3-phase pure bridge antiparallel connection.
	Field Circuit Connection • Single-phase hybrid bridge.
	Running Mode • Motor armature reversal.
	Breaking mode • Regenerative breaking.
	Control System • Speed control (DC tachometer generator feedback, 7v/1000rpm) provided with Current minor loop. • Automatic field-weakening control.
	Acceleration and Deceleration Mode • Current limiting acceleration.
	Current Limit • Max. 120% of rated short-time current.
	Overload Capacity • 120% of rated short-time current for 60 sec.
	Constant Output Control Range 1:3
	Speed Control Range 1:100
	Speed Regulation Stedy offset ; 0.5% or less
	Speed Reference Voltage $\pm 10\text{VDC}$ (\oplus Fwd., \ominus Rev.) or $+ 10\text{VDC}$ (Fwd, Rev. running signal)
	Signal Isolation • Main circuit voltage detecting signal, Armature current detecting signal, and field current detecting signal are isolated.
	Cooling system • fan-ventilated type
	Environment
Humidity • 95% or less	
Altitude • 1000m or less	

■ STANDARD INTERFACE

Item	Name	Explanation
Input	1 Operation Ready Signal	Close : Field strengthening current Open : Gate blocking → Free run stop (field current decreased)
	2 * 1 Running Signal	Close : Speed reference ON → Accelerating up to preset speed Open : Speed reference OFF → Regenerative breaking stop → Gate blocking
	2a * 1 Fwd. Running Signal	Close : Speed reference ON → Accelerating forward up to preset speed Open : Speed reference OFF → Regenerative breaking stop → Gate blocking
	2b * 1 Rev. Running Signal	Close : Speed reference ON → Accelerating reverse up to preset speed Open : Speed reference OFF → Regenerative breking stop → Gate blocking
	3 Current Limit Change-over Signal	H : Standard setting 120% current (100 to 200% adjustable) L : 0 to 50% adjustable (Change-over H to L at contact closing)
	4 Trouble Detecting Reset Signal	Normal close. Reset on contact opening.
	5 Speed Reference	± 10 VDC max., or + 10VDC max. (5mA max.)
	6 Override Signal	50 to 150% adjustable (with 100% limit)
Output	1 Zero Speed Signal	Contact closing at motor speed drops 20 ± 10 rpm. or less (* 2)
	2 Speed Coincidence Signal	Contact closing at motor speed is within ± 15% of setting speed (* 2)
	3 Trouble Detecting Signal	Contact closing (opening) at any trouble (* 2)
	4 Speedometer Signal	Connect one-way swing DC 1 mA meter. (• Internal resistance : 2kΩ or less) (• Full scale at max. speed)
	5 Main Circuit Ammeter Signal	Connect one-way swing DC 1 mA meter. (• Internal resistance : 2kΩ or less) (• Full scale at 120% current)

Note * 1 Running signal (Item 2) is required when speed reference is
± 10VDC, Fwd, and ReV. running signal (Item 2a and 2b) are
required when speed reference is + 10VDC.

* 2 Contacts capacity : 0.5 A or less, 24VDC.

Warning at Wiring

- 1 Separate AC wiring from DC wiring.
- 2 Use shield wire for wirings of speed reference, speed feed back, speedometer
signal and main circuit ammeter signal.
- 3 Use twisted wire for wiring of trouble detecting reset signal.
- 4 Taking into consideration that load capacity of following signals
are 24VDC, 12mA, high reliability contacts must be used for
operation ready signal, running signal and current limit change-
over signal.

■ OPTIONAL FUNCTION

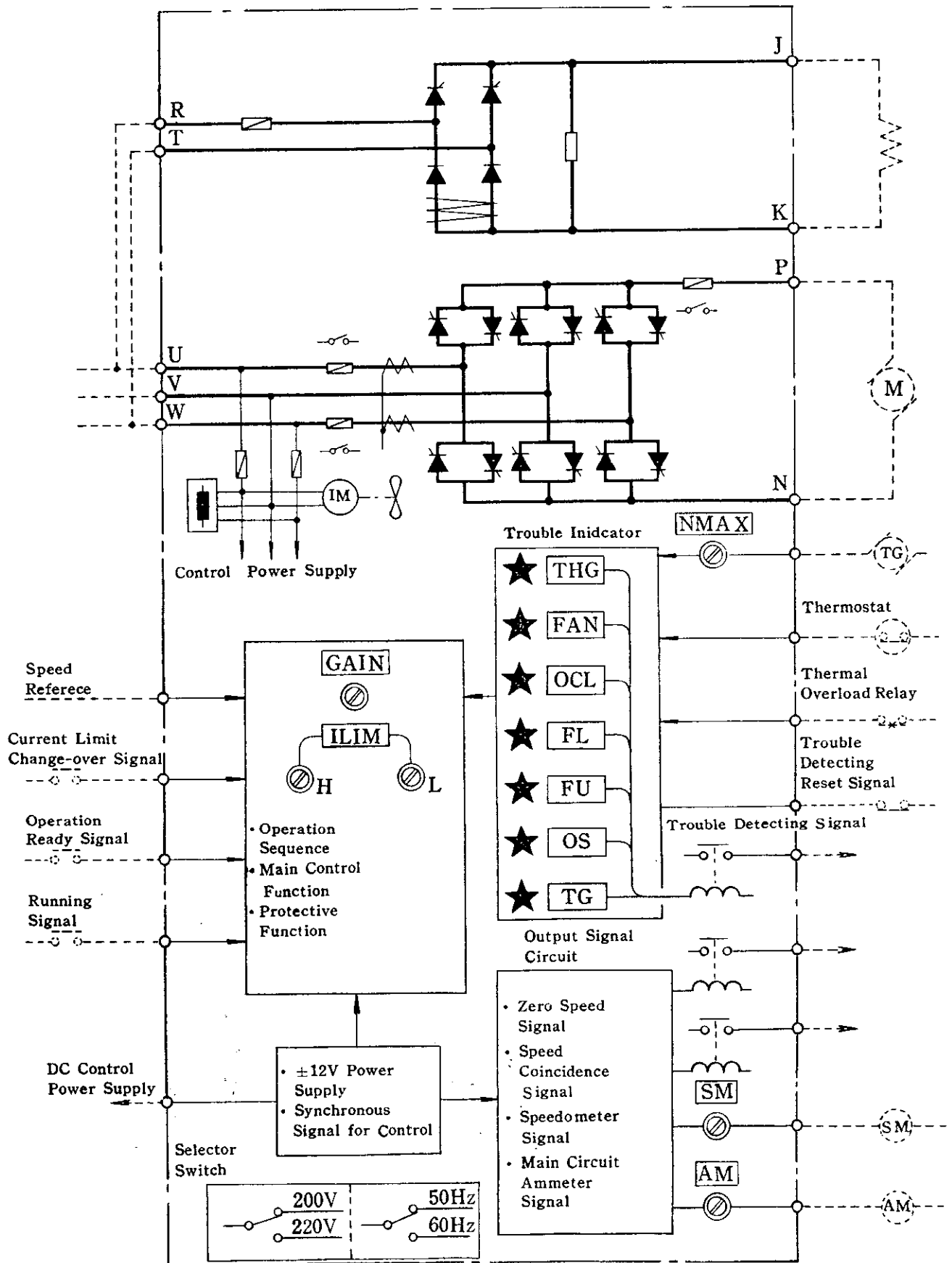
Contact signal for external trouble indicator : AC 110V 0.5A, or
DC 48V 0.5A or less

	Name	Explanation	Diagram
1	Motor Overheating	Contact closing when thermostat operates.	
2	Motor Cooling Fan Overload	Contact closing when thermal overload relay operates.	
3	Field Loss	Contact closing at loss-of-field.	
4	Motor Overspeeding	Contact closing when Motor is overspeeding, or tachometer generator is troubled.	
5	Thyristor Trouble	Contact closing at thyristor overcurrent, overload or fuse blown-off.	

■ PROTECTIV FUNCTION

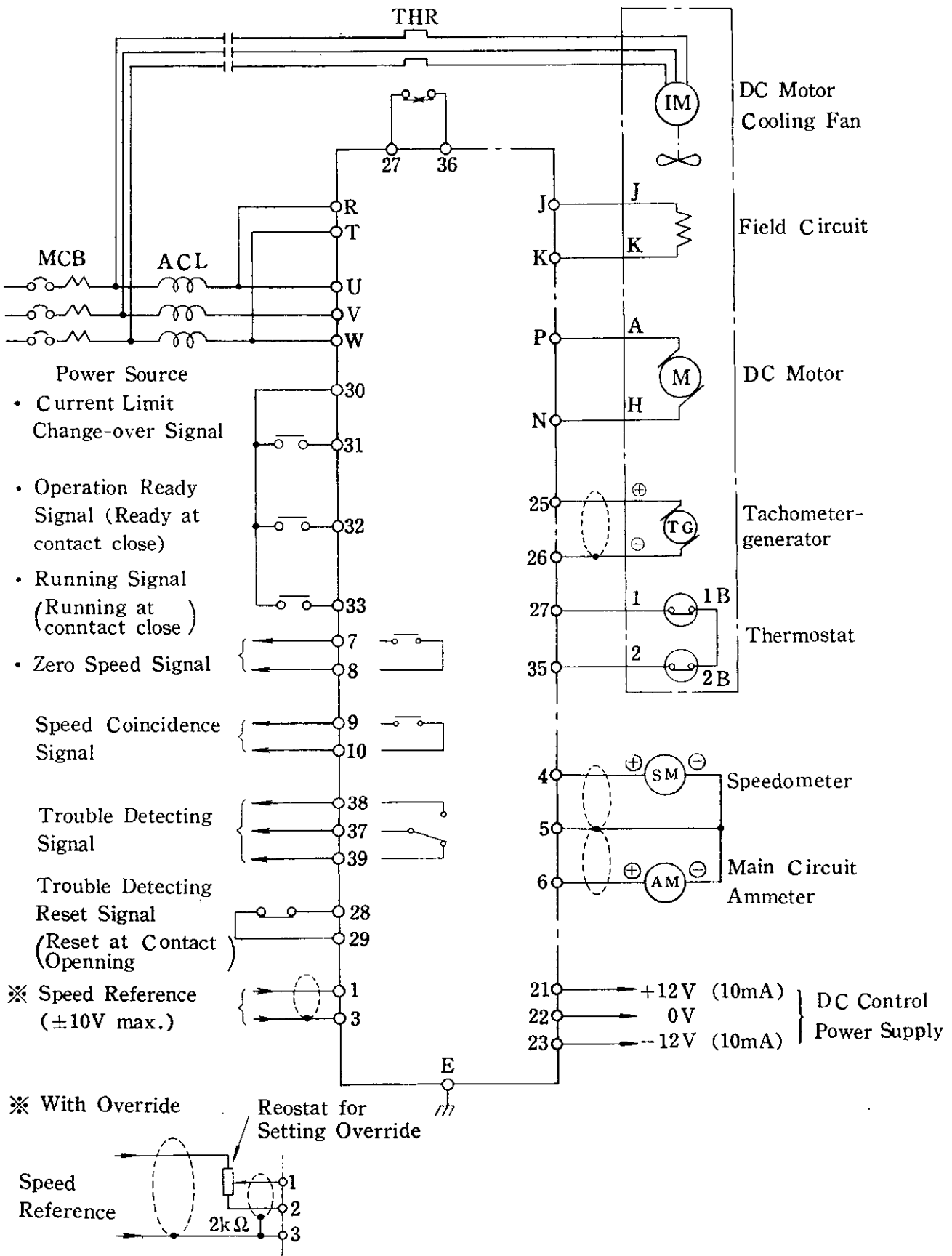
	Name	Explanation
1	Motor overheating	Gate blocking at thermostat operated.
2	Motor Cooling Fan Overload	Gate blocking at thermal overload relay operated.
3	Field Loss	Gate blocking at loss-of-field.
4	Thyristor Overcurrent	Protected by thyristor fuse blown-off and gate blocking.
5	Thyristor Overload	Gate blocking at 60 sec or more on 120% of rated short-time current.
6	Motor Overspeeding	Gate blocking at 110% (70~110% adjustable) or more of rated speed.
7	Tachometer-generator trouble	Gate blocking at tachometer-generator disconnected or short circuited.
Trouble detecting		Contact closing (or opening) at any trouble of the item 1 to 7. (Item 1 to 7 are respectively indicated by light emitting diodes)

■ SIGNAL LINE DIAGRAM

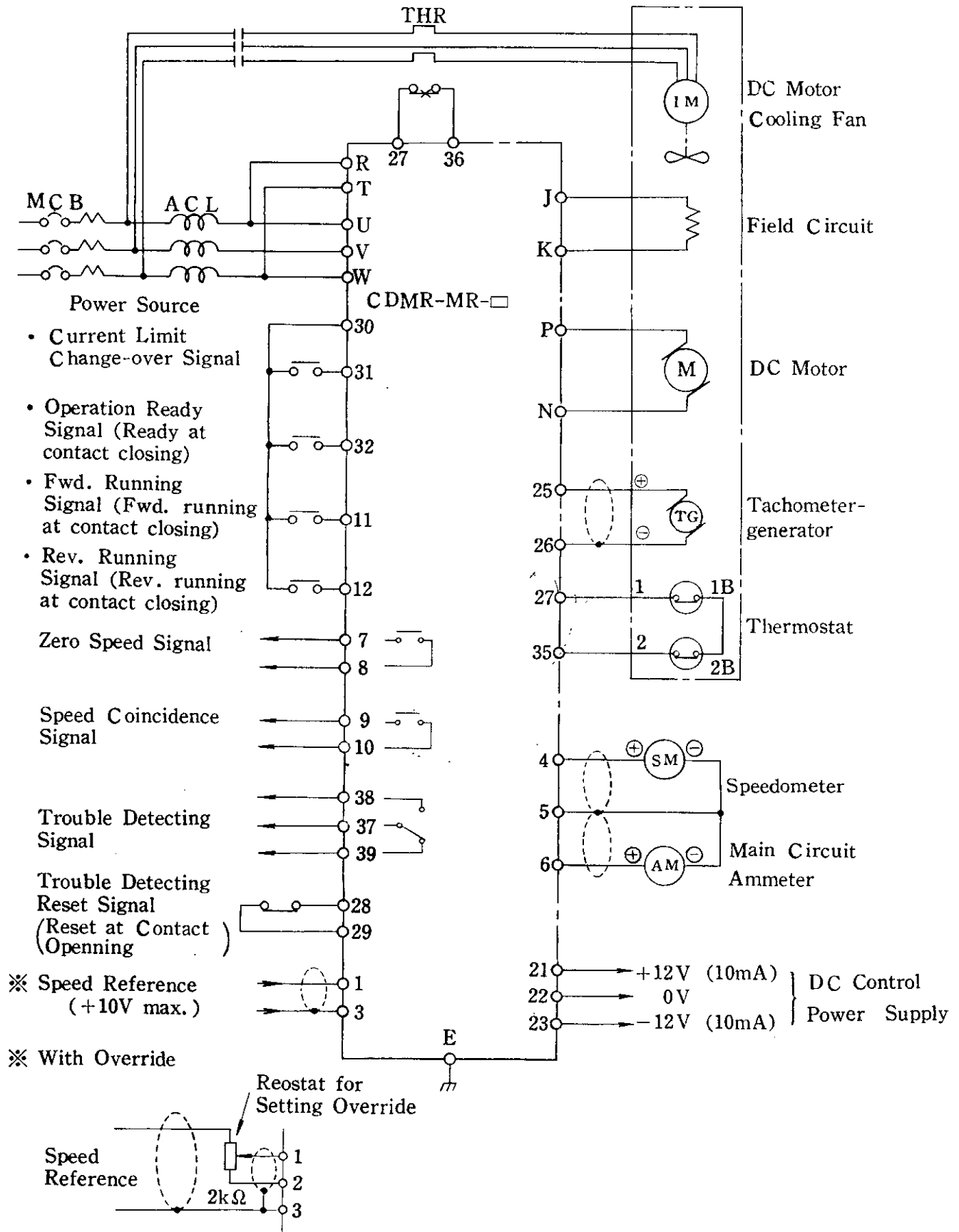


INTERCONNECTION DIAGRAM BETWEEN DEVICES

① In case of speed reference ± 10 VDC



② In case of speed reference + 10VDC



■ PERIPHERAL DEVICE LIST

※ In specifications of thermal overload relay are shown ratings of Motor cooling fan for totally-enclosed DC motor. Select appropriately thermal overload relay according to ratings of motor cooling fan.

Item	Code	Name	Specification			Remarks
			5.5K	7.5K	11K	
1	ACL	AC Reactor	UZBA 36A	UZBA 36A	UZBA 55A	
2	MCB	Molded-case Circuit Breaker	NF50-CB 50A	NF50-CB 50A	NF100-CB 75A	
3	THR	Thermal Overload Relay ※	RH-18/0.26P	RH-18/0.26P	RH-18/0.37P	Not furnished
			200/220/240V 0.25/0.3/0.3A	200/220/240V 0.25/0.3/0.3A	200/220/240V 0.35/0.4/0.4A	

Item	Code	Name	Specification			Remarks
			15K	22K	26K	
1	ACL	AC Reactor	UZBA 70A	UZBA 100A	UZBA 130A	
2	MCB	Molded-case Circuit Breaker	NF100-CB 100A	NF225-CB 150A	NF225-CB 150A	
3	THR	Thermal Overload Relay ※	RH-18/0.37P	RH-18/0.37P	RH-18/0.37P	Not furnished.
			200/220/240V 0.35/0.4/0.4A	200/220/240V 0.35/0.4/0.45A	200/220/240V 0.35/0.4/0.45A	

※※ As motor (22/30kw) is built two motor cooling fans, two thermal overload relay are required.

Item	Code	Name	Specification			Remarks
			30K	37K	45K	
1	ACL	AC Reactor	UZBA 130A	UZBA 170A	UZBA 190A	
2	MCB	Molded-case Circuit Breaker	NF225/CB 175A	NF225-CB 225A	NF225-CB 225A	
3	THR	Thermal Overload Relay ※	※※ / 0.26P RH-18 / 0.37P	RH-18	RH-18	Not furnished.
			200/220/240V 0.25/0.3/0.3A 200/220/220V 0.35/0.4/0.45A	Undetermined.		

■ DIMENSION DIAGRAM OF AC REACTOR

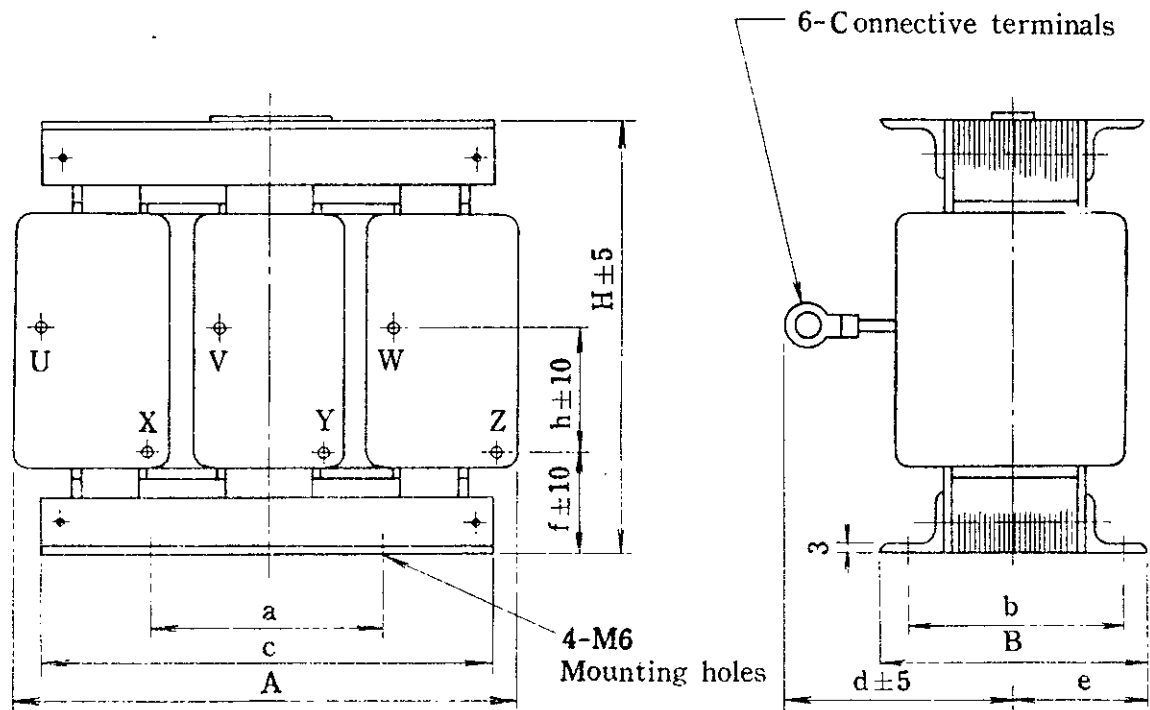
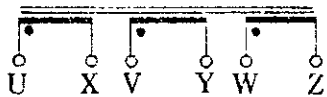


Diagram of taps

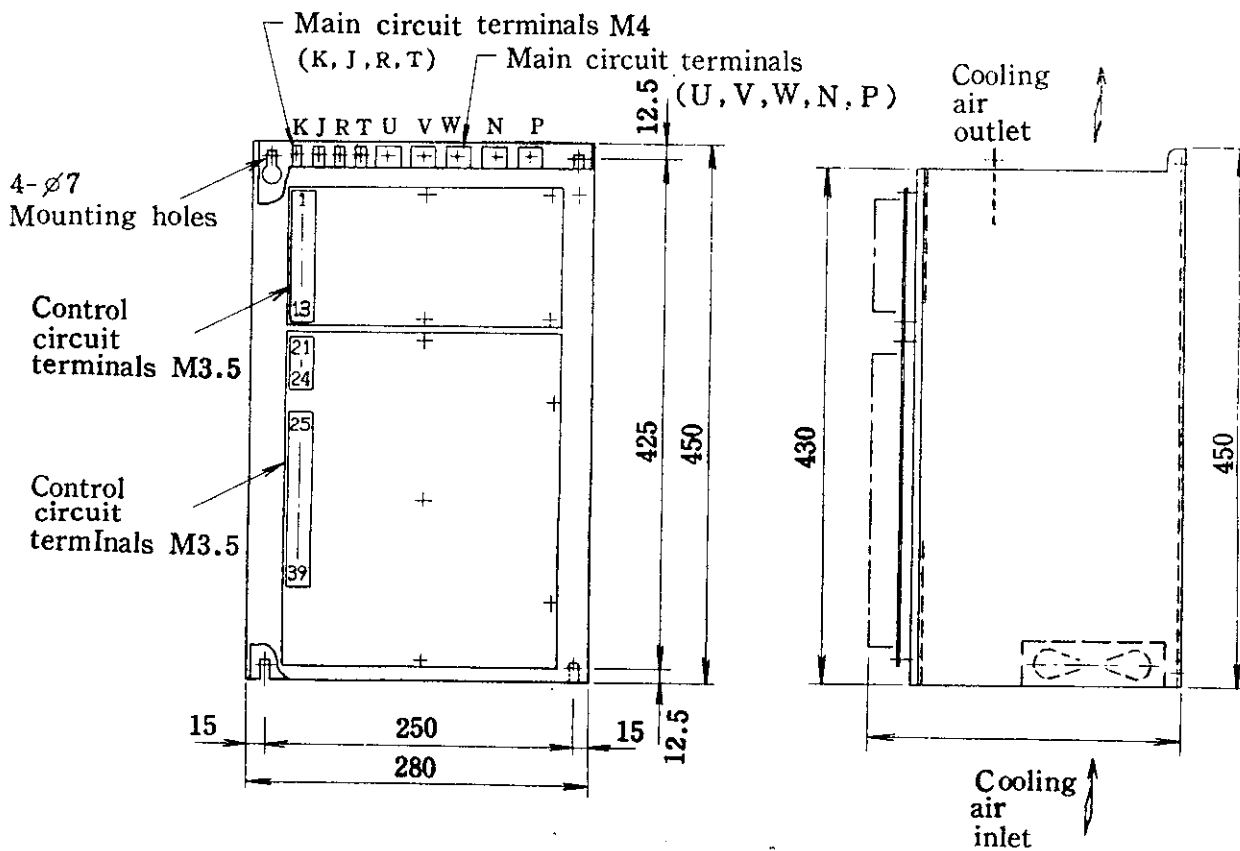
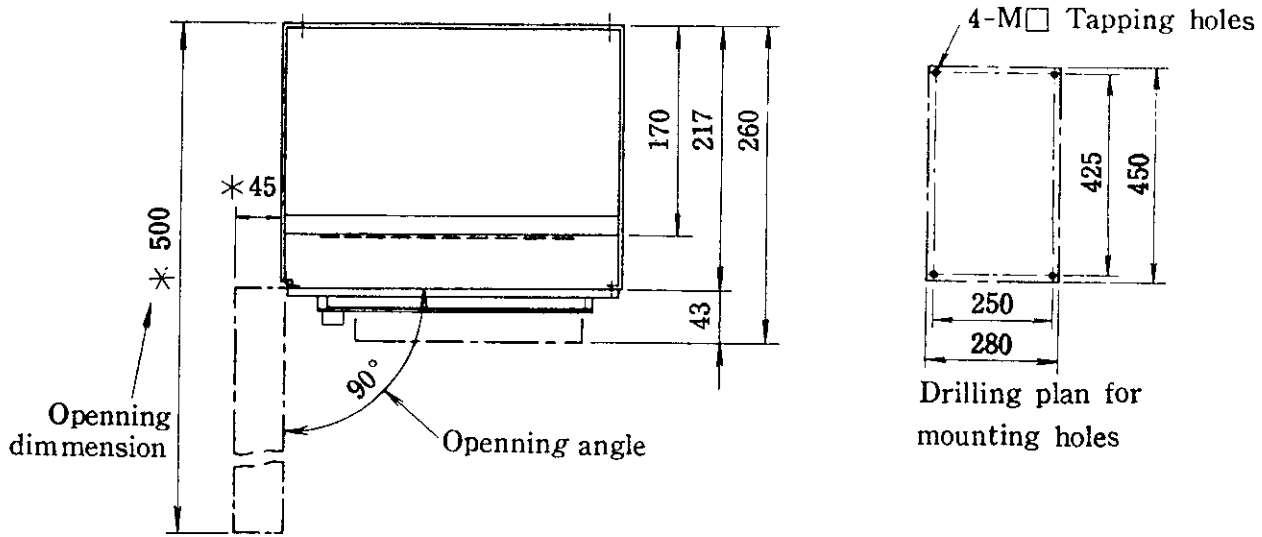


Type	Aprox Weight (kg)	Rated Current (A)	Freq. (Hz)	Dimmensions (mm)										Size of connective holes
				A	B	H	a	b	c	d	e	f	h	
UZBA	4	36	50/60	130	84	110	50	60	130	75	42	26	28	M6
"	6	55	"	160	80	130	50	60	150	75	40	31	45	M6
"	7	70	"	160	94	130	50	70	150	85	47	32	40	M8
"	8	100	"	180	94	160	75	70	180	85	47	40	70	M8
"	8	130	"	180	94	160	75	70	180	95	47	40	75	M10
"	9	170	"	180	110	160	75	90	180	105	55	40	70	M10
"	14	190	"	210	96	200	75	70	205	105	48	50	90	M10
"	14	230	"	210	96	200	75	70	205	105	48	50	95	M12

(Self cooling-type)

■ DIMENSION DIAGRAM OF VS-505 MT

For 3.7kW/5.5kW~18.5kW/26kW



Rated Capacity continuous / 30 min.	Size of Circuit Terminals Connective. holes (N,P, U, V, W)
3.7kW / 5.5kW	M6 tapping holes
5.5kW / 7.5kW	M6 "
7.5kW / 11 kW	M6 "
11 kW / 15 kW	M6 "
15 kW / 22 kW	M8 "
18.5kW / 26 kW	M8 "

For 22kW/30kW~37kW/45kW

