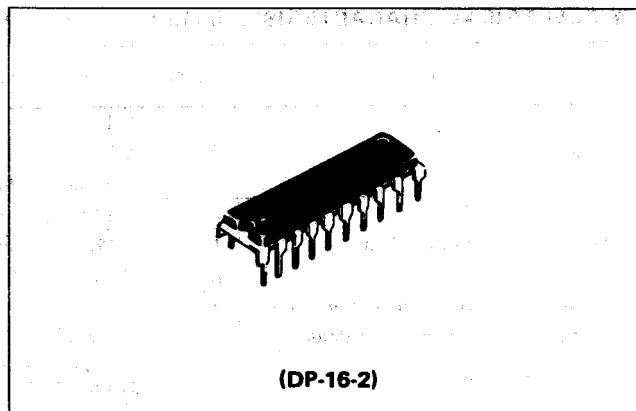


HA11714 • Three-Phase Direct Drive Motor Controller

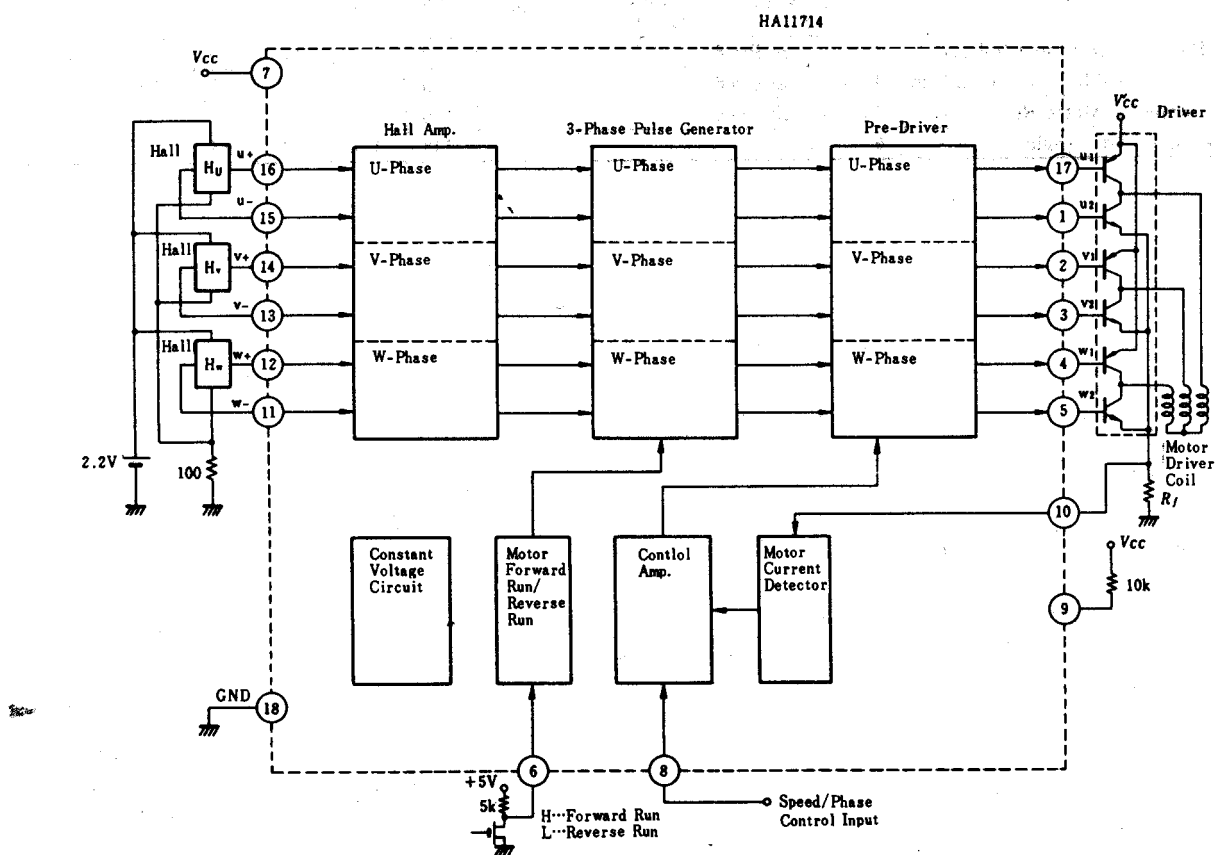
HITACHI

FUNCTIONS

- Three-Phase Control Signal Generator
- Phase/Speed Controller
- Forward/Reverse Run Controller



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

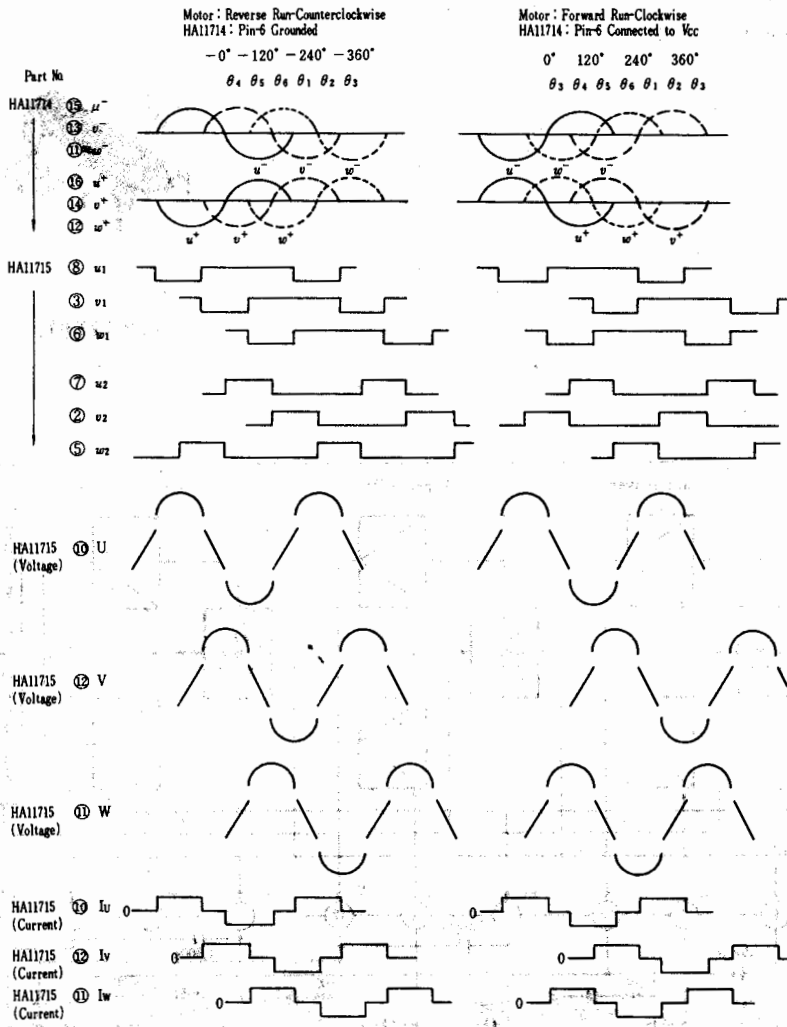
Item	Symbol	Rating	Unit
Supply Voltage	V_{cc}	14.0	V
Power Dissipation*	P_T	600	mW
Operating Temperature	T_{opr}	-20 ~ +70	°C
Storage Temperature	T_{stg}	-55 ~ +125	°C

* Value at $T_a=70^\circ\text{C}$

■ ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vcc = 9V, Vcc = 12V)

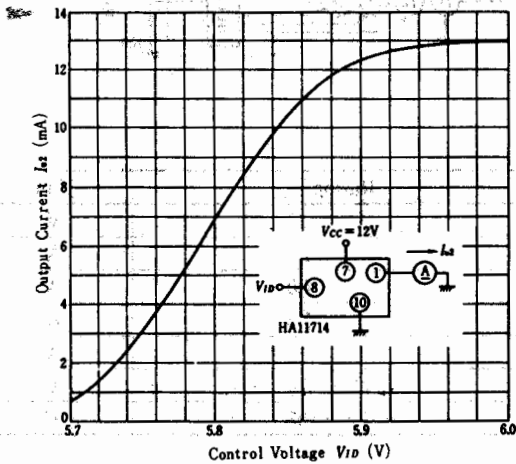
Item	Symbol	Test Conditions	Vcc = 12V			Vcc = 9V			Unit	
			min	typ	max	min	typ	max		
Output Current	I_{U1}	U-Phase at Pin-17	—	2.8	—	—	2.8	—	mA	
	I_{V1}	V-Phase at Pin-2	—	2.8	—	—	2.8	—		
	I_{W1}	W-Phase at Pin-4	—	2.8	—	—	2.8	—		
Maximum Output Current	I_{U2}	U-Phase at Pin-1	—	14.9	—	—	14.9	—	mA	
	I_{V2}	V-Phase at Pin-3	—	14.9	—	—	14.9	—		
	I_{W2}	W-Phase at Pin-5	—	14.9	—	—	14.9	—		
Voltage-to-Current Conversion Gain	g_2		40	80	160	—	80	—	mA/V	
Current Variation between Phase	I	$I_{U1}/I_{V1}, I_{V1}/I_{W1}, I_{U1}/I_{W1}$	-25	0	25	-25	0	25	%	
Closed Loop Gain		Connected HA11714 to HA11715; $R_f = 1\Omega$	—	0.37	—	—	0.37	—	A/V	
3-Phase Signal Input Level	$V_{H(AC)}$	U-Phase: at Pins 16 and 15 V-Phase: at Pins 14 and 13 W-Phase: at Pins 12 and 11	AC	50	100	500	50	100	500	mV _{rms}
	$V_{H(DC)}$			DC	1.9	2.0	4.5	1.9	2.0	4.5
Speed/Phase Control Input Voltage	V_{ID}	at Pin-8	0	6.0	12.0	0	4.5	9.0	V	
Input Voltage for Motor Forward Run	$V_{N/R-N}$	at Pin-6	1.5	3.0	12.0	1.5	3.0	9.0	V	
Input Voltage for Motor Reverse Run	$V_{N/R-R}$	at Pin-6	0	0	0.3	0	0	0.3	V	
3-Phase Conductive Angle	θ		118	121	124	118	121	124	V	

■ TIMING CHARTS

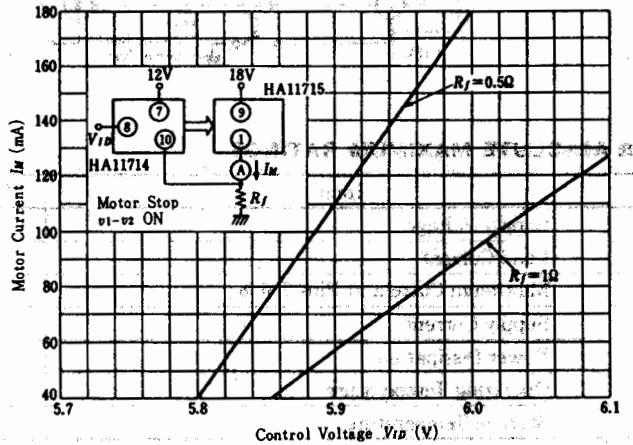


■ TYPICAL PERFORMANCE CURVES

OUTPUT CURRENT VS. CONTROL VOLTAGE



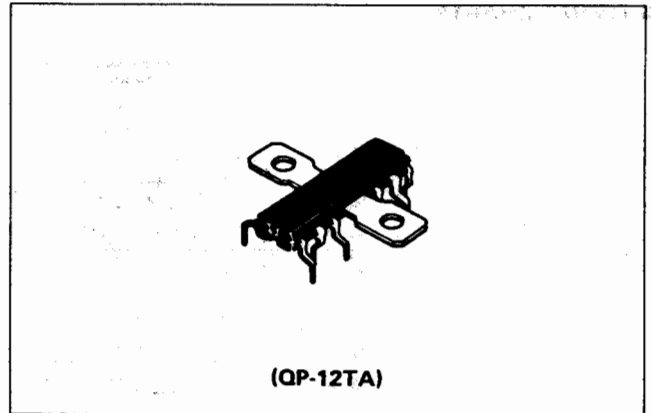
MOTOR CURRENT VS. CONTROL VOLTAGE



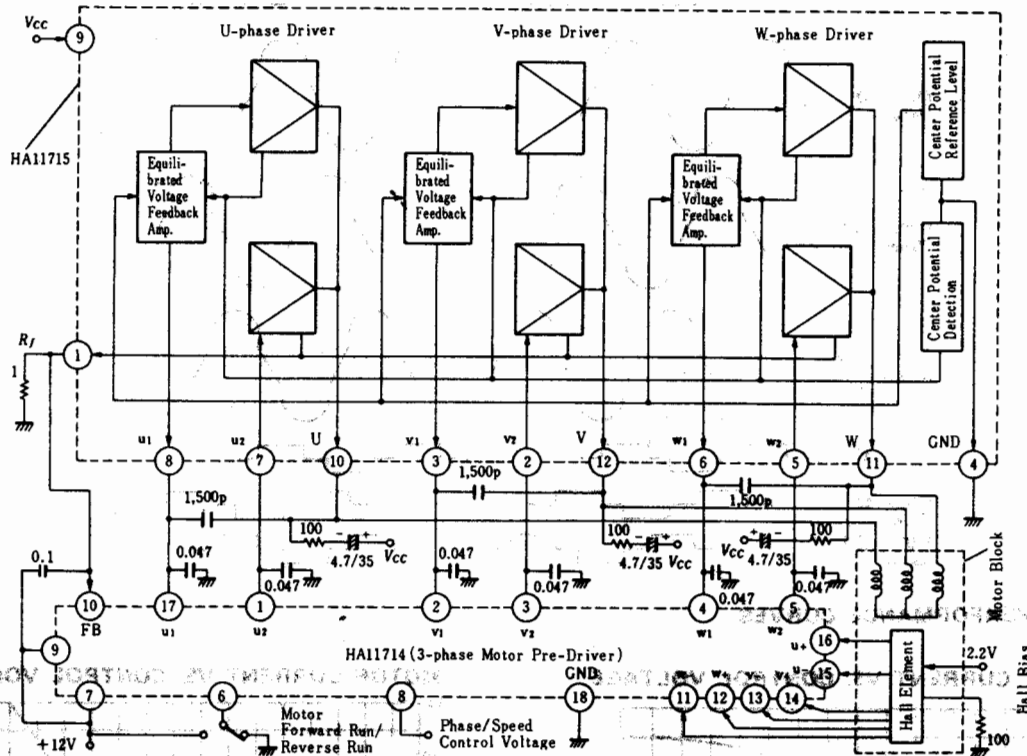
HA11715 • Three-Phase Direct Drive Motor Driver

FUNCTIONS

- Three-Phase Motor Driver
- Feedback Terminal for Current Control



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage	V_{cc}	26	V
Load Current	I_L	1.5	A
Maximum Current at Pins 3; 6, 8	I_{max}	4.0	A
Supply Current	I_{cc}	1.5	A
Power Dissipation	P_r	5*	W
Operating Temperature	T_{opr}	-20 ~ +70	°C
Storage Temperature	T_{stg}	-55 ~ +125	°C

* Value at $T_a = 50^\circ\text{C}$, $\theta_j = 10^\circ\text{C/W}$

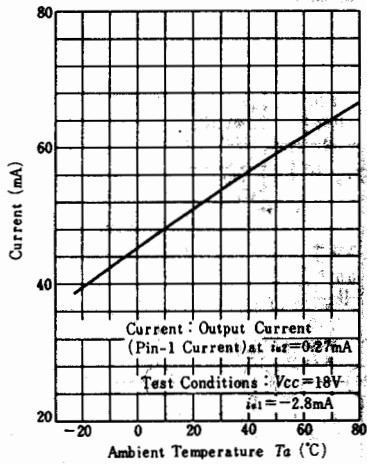
■ ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vcc = 18V)

Item	Symbol	Test Conditions	min	typ	max	Unit
3-Phase Pulse Input Current	$i_{\Delta 1}$	at Pins 8, 3 and 6	1.8	2.8	4.0	mA
	$i_{\Delta 2}$	at Pins 7, 2 and 5	13	—	—	mA
3-Phase Pulse Output Current	$I_{\Delta max}$	at Pins 10, 11 and 12; Resistance between Phases=13Ω	1.0	—	—	A
Feedback Voltage	V_f	$R_f = 1\Omega$; at Pin-1	—	—	1.5	V
Current Gain	G_{Δ}	$I_{\Delta}/i_{\Delta 2}$ Measured; $i_{\Delta 2} = 0.27\text{mA}$	—	45.4	—	dB
Voltage Level at Cross Point	$V_{N\Delta}$	$I_{\Delta} = 50\text{mA}$	8.1	9.5	10.4	V

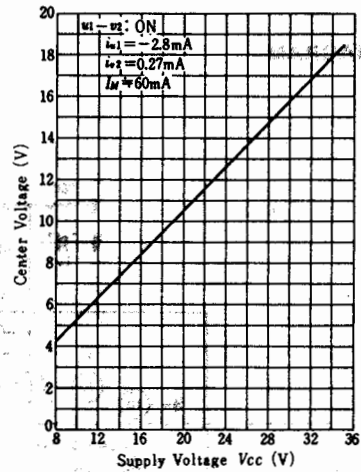
Note) The load current at pins 3, 6 and 8 should not exceed the maximum rating.

■ TYPICAL PERFORMANCE CURVES

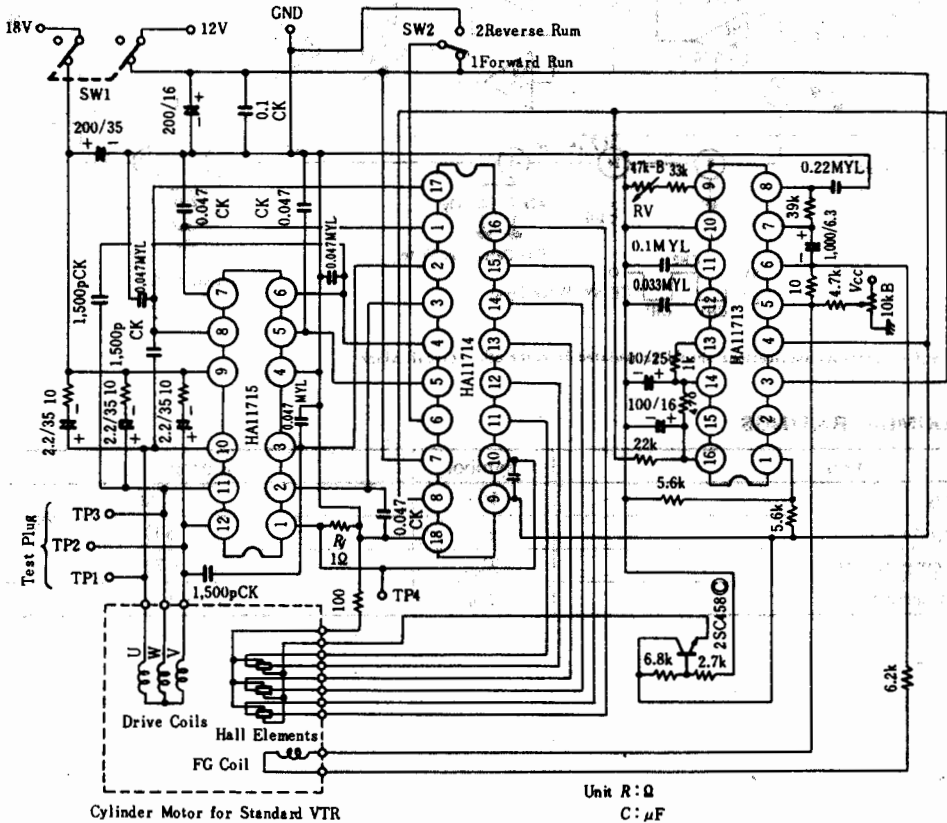
CURRENT GAIN VS. AMBIENT TEMPERATURE



CENTER VOLTAGE VS. SUPPLY VOLTAGE



■ EXAMPLE CIRCUIT USING HA11713, HA11714 AND HA11715



Unit R:Ω
C:μF