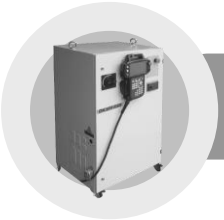
HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

WARNING

THE INSTALLATION SHALL BE MADE BY QUALIFIED INSTALLATION PERSONNEL AND SHOULD CONFORM TO ALL NATIONAL AND LOCAL CODES

Hyundai Robot

Hi5GR121101FMEN1



Hi5 Controller Function Manual

Scheduling Grease Filling Ver.3

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

Printed in Korea – Nov. 2012. 1st Edition

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

Contents

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

1 Overview

1.1. About Scheduling of Grease Filling

The scheduling is a function to send a signal at the time of grease filling, based on the reference distances of the filling and regular replacement cycle of the grease provided on a basis of the makers of grease filling elements comprising each axis of a robot. For this function, the robot informs the users of the time of grease filling in the form of the controller output signal, alarm output (W0018), and state Icon output by calculating the total distance and by setting the regular filling time for each element.

2 User Interface

2.1. Scheduling Grease Filling

The scheduling of grease filling is set on 『System』 → 『3: Robot Parameter』 → 『11: Scheduling of Grease Filling』.

- **Reference Distance (m or rad): Monitoring**
  The reference distances of grease filling are set for each element.

- **Amount of Grease Filling (cc): Monitoring**
  Among elements, the LM Block and Rack & Pinion display the amount of grease filling per block and meter, respectively.

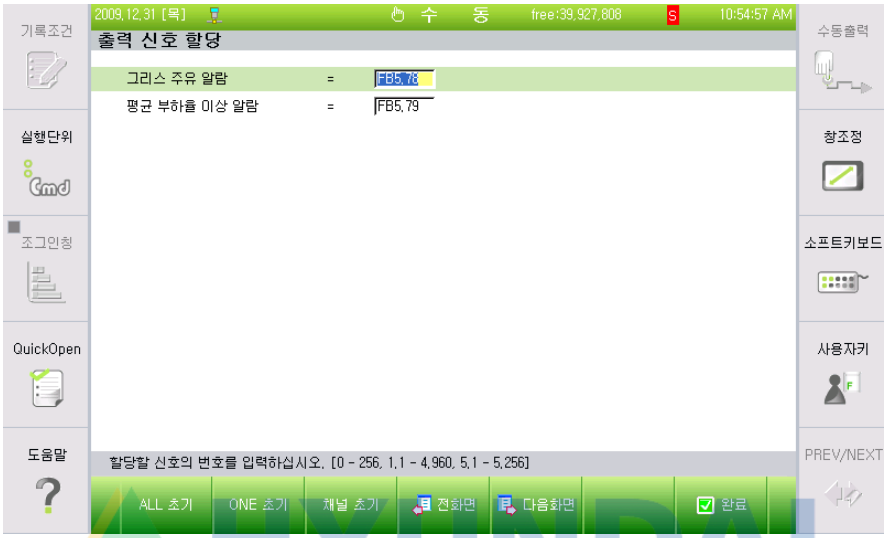
- **Distance (m or rad): Monitoring & Setting**
  ① The total distance may be monitored (displayed in meters or rad).
  ② After filling grease, make sure to set the distance of the involved element to zero (0).

- **Reference Distance Detection Ratio (%): Setting**
  ① Set the reference distance detection ratio. For example, if the reference distance is 100 meters and the detection ration is 80 %, 80 meters are detected as a reference distance.
  ② If the reference distance detection ratio (%) is zero (0), invalidate the detection of the grease filling time for the involved element.

- **Setting Time (Day): Monitoring & Setting**
  Set the regular detection time. For example, if the remaining date is set to ten (10) days, the date gets counted down, and the alarm and signal are output ten (10) days later.
  - In the case of P8 and AP2 robots of LG Display co., Ltd., the initial set value of grease filling time is three (3) months or 90 days.
  - With respect to robot models in the auto industry, the alarm and signal are not output due to a lack of current database. However, the regular filling time is temporarily set to 850 days based on 20,000 hours. Formal data are expected to be registered after the data have been secured afterwards.

2.2. Setting Alarm of Grease Filling

Set a signal that outputs the required grease filling time outwards on 『System』 → 『2: Control Parameter』 → 『2: Setting I/O Signal』 → 『4: Allocating Output Signal』.



The initial set value is zero (0). It shall be set so that the signal is output outwards.
(Note: The allocated signal of grease filling is FB5.DO78)

2.3. Monitoring Grease Filling

- **Signal Output**
  Set a monitoring screen of the output signal set on 『Service』 → 『1: Monitoring』 → 『2: I/O Signal』. When the signal is allocated, it is displayed in bold. When the conditions of signal output are met, it displayed in yellow. (Make sure of # 9 on the Universal Output Signal Monitoring Window as shown in the following figure.)

- **Grease Filling Icon Output** 
  The Icon is displayed in order to signal the grease filing alarm to the left side of “Teach/Playback” mode marks on the teaching pendant. The Icon is flickering (blinking) at the time of greasing filling.

- **Distance (%)**
  The total distance of each current part is the value set on 『System』→『3: Robot Parameter』 → 『11: Setting Greasing Filling Time』, converted into a percentage. When the total distance is 80 % and over, it is displayed in yellow; when the total distance is 100 %, it is in red.

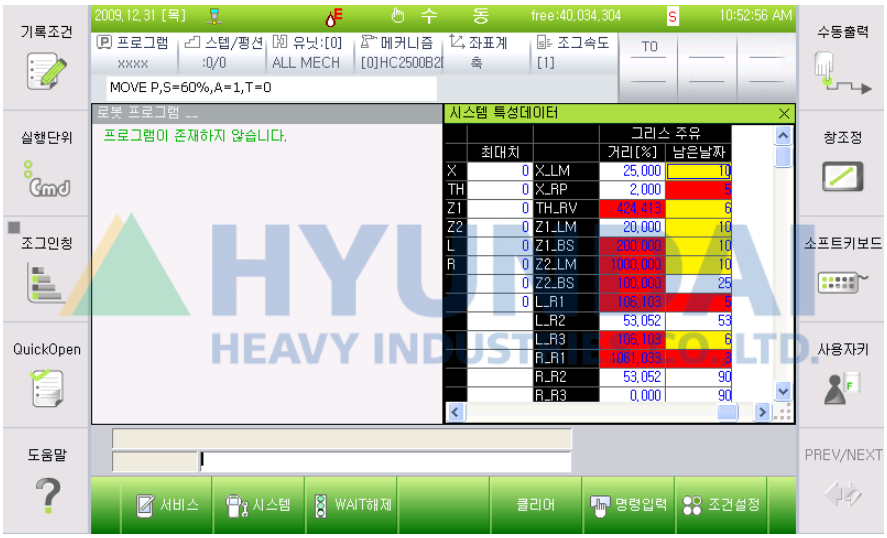
- **Remaining date**
  The value, which has been set on 『System』 → 『3: Robot Parameter』 → 『11: Scheduling Grease Filling』, indicates the remaining date of the current element. Input the next filling schedule after the filling has been completed. When the remaining days are less than ten (10) days, it is displayed in yellow; when the remaining days are within five (5) days, it is displayed in red.

Referenc

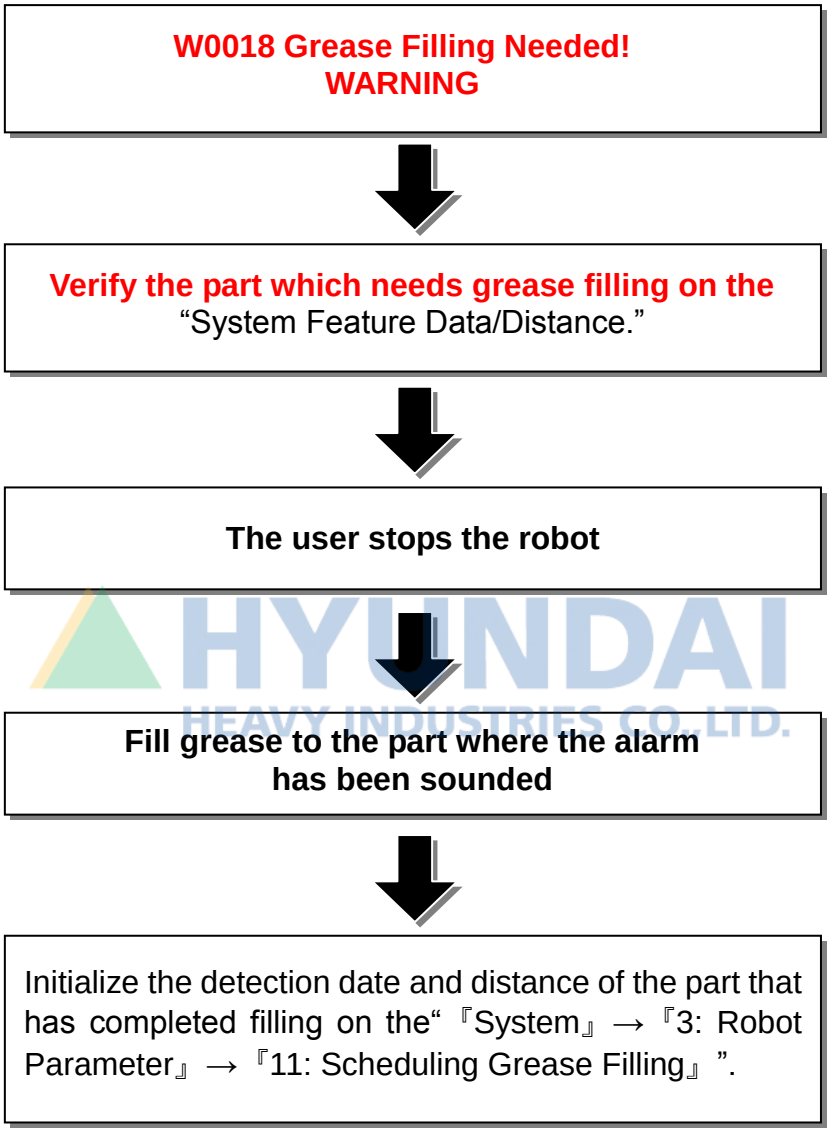
① If the total distance detection ratio of each part of a robot is over the set value, the warning messages (W0018 grease filling needed! Make sure of the System Feature Data/Distance), signals, and Icon are sent outwards and on T/P screen. At this time, the robot continues to run automatically.

② Even when the total distance was not cleared (“0”), automatic operation is possible, and the signals and Icon continue to be sent outwards and on T/P screen.

③ When the control power is on again in the aforementioned conditions, the alarm is always sounded.



2.4. Solution Procedure When the Grease Filling Alarm Is Sounded



- **The time when the user stops the robot depends on the user's judgment.**

2.5. Model Elements for Grease Filling and Filling Data

(1) Standards of the P8 LCD Robot for Returning

Grease Filling Elements			HC2500B2D-3900-10 HC2500B2D_3000_10 (X, TH, Z1, Z2, L, R)		HC2500B2D-3900-00 (TH, Z1, Z2, L, R)		HC2500B2S_3000_10 HC2500B2S_3900_10 (X, TH, Z1, Z2, L)	
			Filling distance (m or rad)	Filling amount (CC)	Filling distance (m or rad)	Filling amount (CC)	Filling distance (m or rad)	Filling amount (CC)
X	X1	LM Block	1,000,000	22 (per block)			1,000,000	22 (per block)
	X2	Rack & Pinion	1,000,000	100 (per meter)			1,000,000	100 (per meter)
TH	TH1	RV decelerator	471,239	4500	471,239	4500	471,239	4500
Z1	Z11	LM Block	1,000,000	8.5 (per block)	1,000,000	8.5 (per block)	1,000,000	8.5 (per block)
	Z12	Ball screw	1,000,000	12	1,000,000	12	1,000,000	12
Z2	Z21	LM Block	1,000,000	8.5 (per block)	1,000,000	8.5 (per block)	1,000,000	8.5 (per block)
	Z22	Ball screw	1,000,000	20	1,000,000	20	1,000,000	20
L	L1	RV decelerator	942,478	1500	942,478	1500	942,478	1500
	L2	RV decelerator	1,884,956	1200	1,884,956	1200	1,884,956	1200
	L3	RV decelerator	942,478	900	942,478	900	942,478	1000
R	R1	RV decelerator	942,478	1500	942,478	1500		
	R2	RV decelerator	1,884,956	1200	1,884,956	1200		
	R3	RV decelerator	942,478	900	942,478	900		

Grease Filling Elements			HC2500B2S_3000_00 HC2500B2S_3900_00 (TH, Z1, Z2, L)		HC2500B1D_1700_10 (X, TH, Z1, L, R)		HC2500B1S_1700_10 (X, TH, Z1, L)	
			Filling distance (m or rad)	Filling amount (CC)	Filling distance (m or rad)	Filling amount (CC)	Filling distance (m or rad)	Filling amount (CC)
X	X1	LM Block			1,000,000	22 (per block)	1,000,000	22 (per block)
	X2	Rack & Pinion			1,000,000	100 (per meter)	1,000,000	100 (per meter)
TH	TH1	RV decelerator	471,239	4500	471,239	4500	471,239	4500
Z1	Z11	LM Block	1,000,000	8.5 (per block)	1,000,000	8.5 (per block)	1,000,000	8.5 (per block)
	Z12	Ball screw	1,000,000	12	1,000,000	12	1,000,000	12
Z2	Z21	LM Block	1,000,000	8.5 (per block)				
	Z22	Ball screw	1,000,000	20				
L	L1	RV decelerator	942,478	1500	942,478	1500	942,478	1500
	L2	RV decelerator	1,884,956	1200	1,884,956	1200	1,884,956	1200
	L3	RV decelerator	942,478	900	942,478	900	942,478	900
R	R1	RV decelerator			942,478	1500		
	R2	RV decelerator			1,884,956	1200		
	R3	RV decelerator			942,478	900		

(2) Standards of the AP2 LCD Robot for Returning

Grease Filling Elements			HC920C2D-900-10 (X, Z1, Z2)		HC920C2D-900-00 (Z1, Z2)	
			Filling distance (m or rad)	Filling amount (CC)	Filling distance (m or rad)	Filling amount (CC)
X	X1	LM Block	100,000	4.2 (per block)		
Z1	Z11	LM Block	100,000	2 (per block)	100,000	2 (per block)
	Z12	Ball screw	100000	12	100000	12
Z2	Z21	LM Block	100,000	1.4 (per block)	100,000	1.4 (per block)

Grease Filling Elements			HC920B1D-1600-10 HC920B1D-2400-10 (X, TH, Z1)		HC920B1D-1600-00 HC920B1D-2400-00 (TH, Z1)	
			Filling distance (m or rad)	Filling amount (CC)	Filling distance (m or rad)	Filling amount (CC)
X	X1	LM Block	100,000	5.2 (per block)		
	X3	Rack & Pinion	100,000	100 (per meter)		
TH	TH1	RV decelerator	942,478	1500	942,478	1500
Z1	Z11	LM Block	100,000	3.2 (per block)	100,000	8.5 (per block)
	Z13	Rack & Pinion	100,000	100	100,000	100

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

- **Head Office**
  Tel. 82-52-202-7901 / Fax. 82-52-202-7900
  1, Jeonha-dong, Dong-gu, Ulsan, Korea

- **A/S Center**
  Tel. 82-52-202-5041 / Fax. 82-52-202-7960

- **Seoul Office**
  Tel.82-2-746-4711 / Fax. 82-2-746-4720
  140-2, Gye-dong, Jongno-gu, Seoul, Korea

- **Ansan Office**
  Tel.82-31-409-4945 / Fax.82-31-409-4946
  1431-2, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do, Korea

- **Cheonan Office**
  Tel.82-41-576-4294 / Fax.82-41-576-4296
  355-15, Daga-dong, Cheonan-si, Chungcheongnam-do, Korea

- **Daegu Office**
  Tel.82-53-746-6232 / Fax.82-53-746-6231
  223-5, Beomeo 2-dong, Suseong-gu, Daegu, Korea

- **Gwangju Office**
  Tel. 82-62-363-5272 / Fax. 82-62-363-5273
  415-2, Nongseong-dong, Seo-gu, Gwangju, Korea

- **본사**
  Tel. 052-202-7901 / Fax. 052-202-7900
  울산광역시 동구 전하동 1 번지

- **A/S 센터**
  Tel. 82-52-202-5041 / Fax. 82-52-202-7960

- **서울 사무소**
  Tel. 02-746-4711 / Fax. 02-746-4720
  서울특별시 종로구 계동 140-2 번지

- **안산 사무소**
  Tel. 031-409-4945 / Fax. 031-409-4946
  경기도 안산시 상록구 사동 1431-2 번지

- **천안 사무소**
  Tel. 041-576-4294 / Fax. 041-576-4296
  충남 천안시 다가동 355-15 번지

- **대구 사무소**
  Tel. 053-746-6232 / Fax. 053-746-6231
  대구광역시 수성구 범어 2 동 223-5 번지

- **광주 사무소**
  Tel. 062-363-5272 / Fax. 062-363-5273
  광주광역시 서구 농성동 415-2 번지