Nissan Diesel Technical Standard

Issue no. DW2-11006-E
Issue date. 6/2/97

Equipment structure standard (Ⅱ) Electricity design standard

Orientation

This standard is written for electricity design of equipments.

Scope and field of application

1. This standard is applied for low voltage electricity of equipments that are installed or remodeled in Nissan diesel. If supplier can not apply this standard, supplier explain the reason with document to Nissan diesel and have an approval.

2.Out of scope:

-1.Multipurpose equipments *

-2.Casting equipments, Equipments worked with gas

-3.Lifting devices

-4.Power supply equipments

*Multipurpose equipment means mass-produced one, and if it is suited to this standard, the cost will be higher remarkably.

Concerning standards

(1)Followings are equipment structure standards

NO	Name	ＤＥＭ number	Remarks
1	Mechanical	ＤＷ２－１１００５－Ｅ	Production machines are main target
2	Electricity	ＤＷ２－１１００６－Ｅ	This standard
3	Programming	ＤＷ２－１１００７－Ｅ	Programming standard for operation
4	Color	ＤＷ２－１１００８－Ｅ	Color standard for equipment
5	Documents	ＤＷ２－１１００９－Ｅ	Documents should be presented
6	Safety	ＤＥ１－５１００２－Ｅ	General safety standard
7	Safety	ＤＷ２－７１００１－Ｅ	Safety standard for machining & assembly machine

(2)Followings are concerned Nissan Motor LTD equipments standards

-1.ＮＥＳ Ｅ－００１６ Flashlight standard

-2.ＮＥＭ ＫＷ２－１１００３－Ｃ Programming standard

-3.ＮＥＭ ＫＥ－２２００１ Equipment standard for electricity

Contents

1.Part and material demands

Parts	No	Parts name	Nissan diesel standard	Model code (Brand)	Reference	Model code (Brand)	Remarks
Motor	1	Motor	TFO-K,KK (Hitachi co.)				J I S standardized goods
	2	Motor with ON brake	ND (Hitachi co.)				J I S standardized goods
	3	Motor with OFF brake	HBF,HBD (Hitachi co.)				J I S standardized goods
	4	Motor with reduction gear	(Sumitomo co., Hitachi co.)				
	5	Others Special Motor					
Breaker	1	Breaker	EG,SG series (Fuji-electronics co.) E,F,R series (Hitachi co.)		NV-C.S series (Mitsubishi co.)		
	2	Circuit Protector	NRC series (Izumi co.)		CP series (Fuji-electronics co.)		Rail fixed type Fixed measure shall be unified
	3						
	4	Fuse	SP-4 series (Daitou-tsuushin co.)				
Meter	1	AC voltage meter 1	2112-20 (Yokokawa co.)		ACF-8 (Toyo-keiki co.)		Fixed measure shall be unified
	2	AC voltage meter 2	2122 (Yokokawa co.)		ACF-6 (Toyo-keiki co.)		
	3	AC current meter 1	2123-20 (Yokokawa co.)		ACF-8 (Toyo-keiki co.)		
	4	AC current meter 2	2123 (Yokokawa co.)		ACF-6 (Toyo-keiki co.)		
	5	Speed meter	2102 (Yokokawa co.)		AVF-11 (Toyo-keiki co.)		
	6	Meter relay	NOR-52R (Toyo-keiki co.)				
	7						

Parts	No	Parts name	Nissan diesel standard	Model code (Brand)	Reference	Model code (Brand)	Remarks
Relay	1	Electromagnetism Switch	SC Series (Fuji co.)				Fixed measures shall be suited to Fuji co.
	2	Electromagnetism contactor	H series (Hitachi co.)				Fixed measures shall be suited to Fuji co.
	3	Sub relay 1	SRCa50-3F (Fuji co.)				8a,6a2b,4a4b Fixed measures shall be suited to Fuji co.
	4	Sub relay 2	SRCa3631-0 (Fuji co.)				4a,3a1b,2a2b Fixed measures shall be suited to Fuji co.
	5	Miniature relay	MY-4N (Omuron co.)		HH54P-L (Fuji co.) HH23PN-TL		Wiring sockets shall be common
	6	Miniature relay	LY-2N (Omuron co.)		HH62P-L (Fuji co.)		Wiring sockets shall be common
	7	Keep relay	MY-2KP (Omuron co.)		HH52P-R (Fuji co.)		Wiring sockets shall be common
	8	ﾗｯﾁﾝｸﾞﾘﾚｰ	MKW22P (Omuron co.)				Wiring sockets shall be common
Timer	1	Timer	H3B series (Omuron co.)		H3CA series (Omuron co.)		Wiring sockets shall be common DIN48□
	2	Ｙ－△Timer	H3BG-8H (Omuron co.)				Wiring sockets shall be common DIN48□
	3	Off-delay timer	H3BH-8 (Omuron co.)				Wiring sockets shall be common DIN48□
	4	Miniature timer	TDE (Omuron co.)		ATA-SP (Omuron co.)		Wiring sockets shall be common
	5	Miniature timer	H3Y (Omuron co.)				Wiring sockets shall be common
	6	Miniature timer	MY4V (Omuron co.)				Wiring sockets shall be common
	7	Multi function timer	H3CA (Omuron co.)				Wiring sockets shall be common
	8	Twin timer	TDA (Omuron co.)				

Parts	No	Parts name	Nissan diesel standard	Model code (Brand)	Reference	Model code (Brand)	Remarks
Timer	9	Digital timer	H5CN (Omuron co.)		SD4, SD4D (Fuji .co)		Wiring sockets shall be common
Counter	1	Cycle counter	(Hokuyou co.)				7 figures Cycle counter
	2	Daily counter	(Hokuyou co.)				4 figures, Manual, with reset function Daily, Tool counter
	3	Electron counter	H7 series (Omuron co.)		MC4 series (Fuji .co)		DIN48□
	4	Mini-counter	H7EC-BVLM (Omuron co.)				
	5						
	6						
Limit switch	1	Lever shape limit switch	(Yamatake hanewel co.) 1LS1-J series		(Omuron) WL series		Fixed measure shall be unified
	2	High sensitivity limit switch	(Yamatake hanewel co.) 1LS19-J series		(Omuron) WL series		Fixed measure shall be unified
	3	Duplication seal limit switch	(Yamatake hanewel co.) 1LS1-JS series		(Omuron)		Fixed measure shall be unified
	4	Full mold limit switch	(Yamatake hanewel co.) 1LS1-4V series		(Omuron) WLCA2-RP40		Cable length: 4m Fixed measure shall be unified
	5	Plunger limit switch	(Yamatake hanewel co.) 5LS7-J series		(Omuron) WLD28		Roller type Fixed measure shall be unified
	6	Plunger limit switch	(Yamatake hanewel co.)		(Omuron)		Flat type Fixed measure shall be unified
	7	Multiple limit switch	(Yamatake hanewel co.) LDZ-5□12		(Omuron) □VBQ2-12N		Fixed measure shall be unified, Approval content Max 6 successions
	8	Multiple limit switch	(Yamatake hanewel co.) LDV-5□12		(Omuron) □VBQ3-1N		Fixed measure shall be unified, Approval content Max 6 successions
	9	Micro switch	(Yamatake hanewel co.) BZ series		(Omuron) Z-15 series		Fixed measure shall be unified Connector tighten by screw, Approval contents

Parts	No	Parts name	Nissan diesel standard	Model code (Brand)	Reference	Model code (Brand)	Remarks
Switch	1	Push button Switch	(Fuji-electronics co.) AH-F 11,AR30 series		(Izumi co.) ABW series		φ30,1a,1b Green, Red, Yellow, Black
	2	Mushroom shape Switch	(Fuji-electronics co.) AH30-MR11,AR30V2R				φ30,1a,1b, Red, Yellow Emergency stop and return
	3	Mushroom shape Switch	(Fuji-electronics co.) AH30-VR11,AR30BOR-10				φ30,1a,1b Red Emergency stop, Mechanical lock type
	4	Push button with light Switch	(Fuji-electronics co.) AH30-L2,AR30 series		(Izumi co.) ALFW series		φ30,1a,1b Green, Orange
	5	Select Switch with key	(Fuji-electronics co.) AH30-P□B11,AR30 series		(Izumi co.) ASN311,ASN322 series		φ30,1a,1b Black 2POS,3POS
	6	Select Switch	(Fuji-electronics co.) AH30-D11□,AR30 series		(Izumi co.) ASD series		φ30
	7	Push Switch with centering function	(Fuji-electronics co.) AH30-S2B22,AR30 series		(Izumi co.) ASBW series		φ30,2a,2b Black, Green
	8	ﾄｸﾞﾙSwitch	(Nihon-kaiheiki co.) S series,M-2012W				Hole for fixing : φ12
	9	Rotary Switch	(Omuron co.) A7PS-254,A7PH-206		(Izumi co.) DGBN-031,036		
	10						
Indication light	1	Circle shape	AH,DR series (Fuji-electronics co.)		(Izumi co.) AP series (Kimuden co.) KH series		φ30 White, Red, Orange, Green, Blue
	2	Small type	(Sato-parts co.) B－３６５０ etc.		(Kimuden co.) KP-142 etc.		Fixing 16,φ5 White, Red, Orange, Green, Blue
	3	Gathered	(Kimuden co.) KFE-27,KFC-27F		(Fuji-electronics co.) AP30 series		
	4	Neon type	(Sato-parts co.) B N series				Fixing φ10,φ１５
	5	Flashlight	(Koito co.) PB,PBS series		(Pato-light co.) SKL,SKH series (Arrow electronics) AS series		φ166, (Red), Yellow, Green
	6	Flashlight	(Koito co.) PB,PBS series		(Pato-light co.) SKL,SKH series (Arrow electronics) AS series		φ130、(Red), Yellow, Green
	7	Cubic light	(Koito co.) PB,PBS series		(Pato-light co.) SKL,SKH series (Arrow electronics) AS series		Yellow + Green (+Red) Yellow + Green
	8	Signal tower	(Arrow electronics) AT□W-100,LT□W-100				Yellow + Green (+ Red)

Parts	No	Parts name	Nissan diesel standard	Model code (Brand)	Reference	Model code (Brand)	Remarks
PLC	1	PLC	(Omuron co.) SYSMAC series		(Fuji electronics co.) MICREX series (Mitsubish co.) MELSEC series		To have programming console Approval content
	2						
	3						
	4						
	5						
	6						
Switch	1	Amplifier for nductive sensor	(Omuron co.) E3JM,E3S,E3N series		(Keyence co.) PW,PZ series		Approval content With amplifier type is desirable
	2	Inductive	(Omuron co.) TL,E2E,E2F series		(Yamatake-hanewel co.) FL2,FL7,FL7M-P series		φ30,φ18 with Moving indicator Cylinder shape, Unify the screw diameter
	3	Inductive			(Keyence co.) EV,EM series		φ30,φ18 with Moving indicator Cylinder shape, Unify the screw diameter
	4						
	5						
Others	1	Pressure switch	(Yamatake co.) Ｌ４０４Ｆ		(Washimiya co.) ＹＰＳ．ＳＰＳ		Approval content
	2	Temperature control device					Approval content
	3	Gas control device					
	4	Changeable resistance	(Cosmos co.)		(Midori co.)		
	5	Potention meter	(Midori.co)		(Cosmos.co)		Fixing shall be unified
	6	Transformer	(Toyozumi-co.) ＳＯ２１－Series				Divorce type transformer
	7						

2.Control boards

1.Structure

Dust & water prevention, Height from floor

1) Control boards are prevented from Dust & water.
2) Floor height of control board shall be 100mm from floor level.

Parts assembly

3) Each parts of control board shall be fixed at height of under 1800mm from operation stand.

Drawing store

4) Pocket for storing the drawing shall be fixed inside of control board.
   * It's able to be fixed out side of control board after the discussion with Nissan diesel.

Handle at out side

5) The handle for main breaker shall be fixed at out side of control board to be abele to operate from out side of it. And also it is able to confirm the trip condition from the operator. It is able to do maintenance even if main breaker does not down.

Plugs

6) If it is used the electron controlled unit for control board, AC100V plug circuit (with earth, Capacity 300VA) shall be placed. And it shall be distinguished control circuit with transformer or breaker.
   *Lightning circuit : Unify with AC100V

Light inside of control board

7) Light shall be placed inside of control board.
   Power supply shall be took from preliminary main breaker with divided breaker.

Ground

8) Ground connector shall be placed near the main breaker.

Door width

9) Door width shall be under 500mm/door.

Cooling

10) Following cooling systems are Not allowed.
    - Take the air from outside of control board
    - Exhale the air to outside of control board

3.Operation boards, Monitors

1.Structure

Dust and water prevention

1) It shall be used dust and water prevention types.
2) It shall be sustained one side with hinge
3) Indication lump, push button and selector are gather up with same kind of block. And it for manual operation shall be divided with black wire (width: 5mm).
4) Button for emergency stop and return it shall be placed that position is easy to push by operator.
5) Button layout shall be gather with same kind of function.
6) Push button that operated both hands shall not be operated with one hand.
7) If there are a lot of stations, Sub-operation board shall be placed.

8) If there are a lot of stations, the cycle indicator shall be placed separately.
9) If more than 10 indication lumps are placed, selector switch (or button) for lamp checking shall be fixed at the main control board.

2.Colour of push button

No	Substance		Color	Remarks
1	Start		Green	Ready for starting, Cycle starting
2	Stop		Red	
3	Manual control	Go	Green	The direction for leaving to base position
		Back	Yellow	The direction for return to base position
4	Stop the next cycle		Yellow	Stop after 1 cycle
5	Emergency stop		Red	Mushroom shape, mechanical lock type
6	Emergency return		Yellow	Mushroom shape
7	Reset		Yellow	Condition reset
8	Bell, Alarm		Black	
9	Check		Black	Check the lamp
#	Others		Black	The functions that are not concerned the machine moving.
#	Selector		Green	
#	Switch		Black	Change the mode

3.Colors of indication light and push bottom with lump

No	Substance		Color	Remarks
1	Power and Air supply		White	All resource contents
2	Ready for starting		Green	
3	While an automatic driving		Green	
4	Caution		Orange	
5	Machine error		Red	Too much load, lubrication error, etc.
6	While a stopping the cycle		Orange	Full work, No work, etc.
7	While a emergency stop		Red	
8	All parts are at base position		Green	Automatic driving condition shall be satisfied.
9	Each parts are at base position		Green	
#	Parts are not at base position		Orange	
#	Machine has worked completely		Blue	
#	Each pars are driving		Orange	
#	Tightening		Orange	
#	Measuring	O K	Green	
		N G	Red	
#	Machine is recognizing a work		Orange	
#	Changing the each mode		White	
#	Indicate for manual choice		Green	
#	Indicate for auto-choice		Red	

4 Signal tower

1) Signal tower are used to indicate to machine and operator conditions.

2) Position, color and indication substance shall be followed below.

Position	Color	Indication	Variation	Substance
Upper	Red	Blink	Emergency	It shall be able to change the settings.
Middle	Yellow		Caution	It will be occurred if it leaves. When the maintenance.
Lower	Green		Production Quality	When the problem of manufacturing or quality Full work, No work

3) Signal tower shall be adopt in case of operators have to confirm the equipment condition far from it.

4) If there are a lot of operation board, add the below contents.

Position	Color	Indication	Variation	Substance
Upper	Red	Lightning	Operation board	When it is valid as main operation board, both red and green shall be lightning.
Lower	Green			

5. Flashlight

Specifications of flash light shall be informed to Nissan diesel before final decision.

6. Andon light

See robots standard

4.General wiring demands

1.Genaral

1) Colors of electric wire

No	Contents		Color	Remarks
1	Power supply circuit	R	(Black) Red	AC200V
		S	(Black) White	
		T	(Black) Black	
2	Control circuit		Yellow	AC100V
	Direct current circuit	(□)	Blue	
		(□)	Red	
3	Earth wire		Yellow/Green	Just Green is also allowed.
4	Electron circuit		No standard	

① Equipments for multipurpose are out of scope.

② The cables that have Several lead are out of scope. However Green must not use except earth wire.

2) Types and minimum diameters of electric wires

No	Contents	Min. diameter	Type	Remarks
1	Power supply circuit	2.00mm□	A	Only for inside of control board
2	Control circuit	0.75mm□	B	
3	Wrapping	φ0.5mm	C、D	

A. KIV　　B. VSF　　□□□□Enick wire

□□Enick wire cable

Terminals

3) Connecting at terminals shall be used pressure connecting device.
4) The shapes of pressure connecting device shall be followings .
   - Power supply circuit : Circle shape
   - Control circuit : Y shape

Marking tubes

5) Terminal connector shall be used marking tubes and specify the terminal number.
   *It shall be unify with drawings.
6) The mark tubes shall be used the burn printed types.

Terminal boards

7) Wire shall be relayed through the terminal board.
8) PLC are regarded as terminal board.
9) Wiring terminal boards shall be filled the wiring number.
10) Connecting at the terminal board, position of connector shall be divided with kind of purpose.
    (E.g. wiring inside of control board : Upper side, wiring concerning machine : Lower side)
11) Terminal board shall be fixed the clear divorced cover.
12) Connecting to main ＮＦＢshall be directly.

2.Duct for wiring inside of control board

1) Wiring inside of control board shall be used a duct made of plastics. Except wrapping)

Fix the divorced cover

2) Main breakers and divorced transfer for 200 voltage shall be used clear divorced cover.
3) Earth of control board shall be connected to earth terminal with gathered up.

3.Wiring around equipments

1) Wiring ducts and materials

No	Used positions		Materials
1	Control board	Body Oil pressure unit Cycle indicator Control board other units	Ａ、Ｂ、Ｃ
2	Machine body	Motor Switch Among box Solenoid valve Others	Ｂ、Ｃ、Ｄ、Ｅ
3	Moving part		Ｄ、Ｅ
4	Zone that are fell down a dusts		Ｂ、Ｃ、Ｄ
5	Zone that are fell down a oil		Ｄ、Ｅ
6	Zone that are trod by operator		Ｂ

Ａ. Metal duct
Ｂ. Wiring duct
Ｃ. Plica tube (or corresponded with it)
Ｄ. Nipolex (or corresponded with it)
Ｅ. Captire cable (Oil protection type)

Captire cable

2) Wires shall be protected with electric wiring duct.(Except cap tire cable.)

3) Cap tire cable should be used where safety matter are secured.

Terminal boxes

4) Terminal box shall be prevented from dust and water.

Electric wires

5) About ducts, If it has possibility to have impulse from outside, It shall be used the high strength types.

Oil pressure ducts

6) Each wire ducts or cables shall be fixed tight and it has to be divided from Oil ducts.

Wiring

7) External parts(sensor, etc.) shall be wiring from terminal board to it.
(The wiring between external part and external part are not allowed.)

Wiring for moving part

8) It has to have terminal board at both side of the wire.

Number of install the electric wires

9) [Reference] Number of install the electric wires at moving part.

Duct size / Electric wire	2	3	4	6	8	10	12	16
0.75mm^2	6	10	20	28	50	82	120	200
1.25	4	7	12	17	31	50	74	131
2.0	2	4	7	10	19	30	44	79
5.5	1	2	3	5	9	15	23	40
8.0		1	2	3	6	11	16	28
14			1	2	4	4	6	12

(600V plastic electric wire)

*This data is when it are accommodated with Nopolex tube at 42%.

Plugs

10) If it is used the plugs at the connecting point, tightening types shall be used.

Reserve wire

11) It has to have more than 10% (more than 3) and shall be wrote the number.

Connecting

12) The way to connect the limit switch, inductive sensor, solenoid valves, etc. are decided with discussion.

In hand breaker

13) If motor is placed on blind position, breaker shall be placed around motor.

5.Installing

1.Limit switch, Micro switch

1) It shall be pleased where it's easy to maintenance.

Water and oil prevention

2) It shall be avoided to place the these switch where it fall down the machine oil.
   If it's difficult, double seal types with covers shall be used.

3) Micro switch shall be used that are considered the environment.
4) If changing the parts, it shall able to it without moving the switch.
5) If it is used 1 dock, it shall used 1 switch

2.Pressure switches

1) The space to adjust it has to have.
2) If it will be used the pressure switch, pressure meter shall also be adopted.

6.The way to control

1.General

1) Voltage of control circuit

Voltage

No	Circuit	Voltage	Remarks
1	Power supply	AC200V±10% (AC400V)	・3 aspects ・If it will be used AC400V, to be informed to Nissan diesel.
2	Power supply circuit	AC200V (AC400V)	・AC100V 1aspects : lower than 100W ・If it will be used AC400V, to be informed to Nissan diesel.
3	Control circuit	AC100V DC24V	・Solenoid circuit : AC100V
4	Cycle indication light	AC100V DC24V AC16V	・Solenoid circuit : AC100V
5	Circle light	AC100V	(Bell, Buzzer, flashlight, Signal tower)
6	Light inside of control board	AC100V	
7	Power supply for maintenance	AV100V	・Plugs etc.

Breakers

2) Open and close of power supply and control circuit are used the breaker.

3) Fixing standard

No	Fix the Breakers			
1	Control board			Fix at position of power supply as a main breaker
2	Motor load	Machining	Not needed	
			Needed	Divided 11kW by 11 kW
		Conveyer	Needed	Divided motor by motor
3	Control circuit	1.25mm^2	10A	Less than 5A
		0.75mm^2	5A	
		ラッビング配線	5A	In case of wrapped wiring
4	Solenoid circuit	Needed		More than 5 solenoids : Bulk fixing Divide 10A by 10A
		Not needed		Less than 4 solenoids : Common with breaker for control circuit
5	Flashlight Circuit	1 breaker in all circuit		More than 20 PL : Bulk fixing
		Not needed		Less than 20 PL : Common with breaker for control circuit
6	Electric circuit	1 breaker in all circuit		Breaker or fuse shall be fixed with unified circuit
7	Light inside of control board	1 breaker in all circuit (nclude the maintenance circuit)		Bulk fixing

Breakers

4) Max capacity of breakers shall be 600AT.

5) In case of equipment that has a lot of control board, control circuit shall be divided with switch.
する。

Open and close of load

6) Motor, heater, solenoid etc. shall be worked that used magnetisms switches or relays.
(It is not concerned with load capacity.)
(It's not allowed to open & close directly with limit switch, micro switch and timer contact.)
*All output shall be trough the contact.

Leakage breaker

7) It must not be used for main breaker.

2.Power supply circuit

Ｙ－△Starting, Sequence starting

1) In case that equipments are used a motor more than 15kW, Basically Ｙ－△ starting way shall be adopted.

2) In case that equipment has many motors and starting in same time is more than 20kW, Sequence starting way shall be adopted.

Phase advancing condensers

3) In case of machine that capacity is more than 7.5kW/unit, it shall have phase advancing condensers. Phase advancing condensers shall be with discharge coil type. And it shall be connected at secondary side of magnetizes switch.

Phase advancing condenser fixing standard

Motor capacity [kW]	Condenser capacity [μ F]
7.5	150
11	200
15	250
19	300
22	400
30	500
37	600

3.Solenoid circuit

1) Solenoid circuits controlled by relay shall be both side cut way and protected by fuse 4 points by 4 points.
2) Solenoid circuits controlled by PLC shall be one side cut way.
3) Solenoid circuit are not allowed to be controlled by PC. It shall be used the power relay.(I/O terminal relays are available)

4.Control circuit

Control circuit has to have exclusive breaker.

Limit switch

1) Clamping shall be recognized at operation point directly with limit switch.

Recognize of touch

2) Switch for recognizing of touch has to have indication lump.

Parallel connecting

3) Detector (Limit switch, Micro switch, etc.) are not allowed the parallel connecting.

Series connecting

4) Number of series connecting at relay shall be less than approx 10.

Error circuit

5) Error circuit are designed that held the error condition and It is not come back until error reset button are pushed. And substance of error shall be indicated as much as possible.

Emergency stop

6) Emergency stop means to secure the safety for operator and prevent the breaking the work. Control circuit shall be pressure free condition except the fraction. Solenoid circuit shall be pressure free for all parts.
7) Emergency stop is most preference than any other systems.
8) Emergency stop buttons shall be followings.
   - Push-lock type or 2 buttons type(Emargency & Return button)
   And the way to return shall be 2 steps. (1st: Operator side, 2nd: Control board)

Ready to starting

9) Control circuit has to have the circuit of ready to starting, After pushing the button, equipment shall be working.
(Before pushing the button, equipment is NOT working.)

10) Lump of ready to starting shall be adopted.

Alarm

11) About equipments for transporting, Equipments shall be working after the alarm.

Operation of button

12) Any indication to start working the equipment, push button shall be used.
(Selector switch or cam switch are NOT allowed.)

Finish the cycle

13) The memory of finish the cycle are NOT reset even if the condition of emergency stop.

Test driving

14) Equipments shall be able to do test drive(Auto-driving & Manual-driving) even if there is no work.

Condition of starting

15) Condition of starting in automatic driving is when all parts are base position and each parts status are not error.

16) Machine shall not stop if the error is not concerned with finish the cycle. And it shall not start the next cycle.

Emergency return

17) When operator push the emergency return button, the machine shall return to base position.

~~18) ネジ送り機構の各動作及び、切削送り切換用のリミットスイッチは２個使用し、うち１個は保安用(Ｂ接点を使用)として回路に組込むこと。又、複数のユニット使用の場合、該当ユニットのみ、その場停止とし、他のユニットはサイクル完了とすること。
該当機構停止を表示灯にて明示し復帰は、単独運転にて復帰とする。~~ Out of Scope

~~工具交換~~ Out of Scope

~~19) タッピングユニットにおいて工具交換等の作業時にユニット等を通常停止位置よりも戻す場合、戻し用押釦にて戻るようにして最後退端より起動するものとする。~~

Lubrication error

20) The equipments that used a concentrated lubrication shall indicate the lubrication alarm with float or pressure switch. This structure shall be decided with discussion with Nissan diesel.

21) If possible, the position to fix the pressure switch shall be end of the lubrication circuit.

6.Electron circuit

Scope

This contents are applied the units that are developed in supplier originality.

Structure

1) Each function shall be unit.
2) Substances of error are indicated as much as possible.

Approval to use

3) Before using, Supplier has to have approval from Nissan diesel.

7.PLC

1) The specification of PLC shall be chose from Parts structure standard, and it shall be suggested to Nissan diesel.
2) It must be considered the cost value.

Interlock

3) RUN signal shall be into condition of driving.

Error indication

4) Error of PLC shall be indicated at control board.

Fuse

5) 1 output module shall have 4 fuses.

Programmable controller

6) If it's placed the PLC, programmable controller shall be placed in the control board.

Save the program

7) Program of PLC shall be presented to Nissan diesel with floppy disk.

ROM

8) It shall be presented the ROM for reserve. And it shall be placed in control board.

Reserve capacity

9) PLC memory, more than 5% reserve force has to have that capacity are more than 4k-wards.'

5.Number of cycle stop for assembly line

1) Circuit of cycle stop means that if cycle stop button is pushed, the equipments will be stop after finish the cycle. After that, Main power supply will be cut automatically.
2) In case of following condition, It shall have cycle stop circuit.
   ① At the end of 1 cycle of program, machine return to base position.
   ② When the machine is working, after operator push the stop any button, it's difficlt to return the machine to base position.
   ③ The machine that is impossible to keep the work inside of machine.
   ④ Stop operation of each movement are needed the timing.
3) When install the cycle stop circuit, Handle of HFB shall not be out of control board. The main NFB shall be able to cut down with electricity. And detail are followings.
   ① Button for emargency power cut (Mushroom shape) shall be fixed at left side of control board.
   ② The name plate of button for emargency power cut shall be fixed.
   ③ Trip coil voltage shall be 200V, and wired from secondary side from main NFB.
4) The circuit for cycle stop shall be through the secondary side of main NFB. The operation voltage shall be AC100V.
5) The magnetisizm switch for power on or off shall be used the 2times of standard capacity.
   The magnetisizm switch shall be used 5-1 type, and specify that is for cycle stop..
6) The operation of start and stop for cycle stop circuit shall be followings.
   ① The operation for cycle stop :
      - Push the cycle stop button
      - Indication lamp for order of stop operation(Orange)
      - After 5 seconds from machine recognize the base position, magnetisizm switch for main power shall be cut down.
   ② The operation for cycle start :
      - Push the power on button
      - Power (AC200V) will be on
      - Push the button for cycle start
      - Ready to start
      - Operations of below wil be avairable

Cycle stop, Colors for circuit wires

7) The color of wire for cycle stop circuit shall be used Red.

7.Energy saving for motor

1.Scope

1) The purpose is energy saving. This content apply the motor that droved only when it needed to drive.
2) This is applied the equipments that are able to suit this countermeasure.
3) After applied this contents, If it has possibility that will occur the safety problem, it apply after the countermeasure of the safety issue.
4) ＮＣ controlled equipments are out of scope.

~~2.主軸電動機制御~~ Out of Scope

~~下記条件を満足する制御とする。~~

~~１サイクル主軸停止~~

~~1) トランスファーマシン，自動化ライン，単体設備共に、ユニット毎に原位置で１サイクル主軸停止する。~~

~~主軸回転後、ユニット前進~~

~~2) 再起動はユニット前進指令で主軸回転し、回転入確認後、ユニットが前進すること。~~

~~順次起動~~

~~3) トランスファーマシンの様に順次起動を必要とする設備は再起動時も順次起動すること。~~

~~4) 集中クーラントの場合主軸を停止させた状態でクーラントを出していると軸受とかギアボックス等に悪影響が出る場合は、クーラントを止める。~~

~~適用除外~~

~~5) 次のものについては停止せず運転を継続【適用除外】させる。~~

~~①研削盤の砥石軸~~

~~②慣性が大きく起動、停止が多いと問題となるもの。~~

~~③起動時間の長いもの。(３秒以上)~~

~~④サイクルタイムが２０秒以下のもの。~~

3.Automatic line

Control of motor for oil pressure pump

1) When the button for ready to start is pushed, Motor for oil pressure pump will be working. Depends on conditions, it will be followings.
   ①Selector switch : Continuance
      a) The oil pressure motor keeps driving when it is not at base position.
      b) When it all are at base position, If it's not pushed the button for cycle start, it will be stop condition within few second.
   ②Selector switch : Manual mode : Oil pressure motor keeps driving
2) If it will be following condition, When in condition of cycle driving, The lamp for oil pressure pump shall be wink at the certain time later with all of it are base position.
   ①No work at entrance
   ②Full work at exist
   ③When the cycle is finished with it got the signal for cycle stop.
   If it will be out of ①,② condition, it shall be re-started after beep the alarm.
   For the re-start of ③, It will be start when the button for cycle start are re-pushed.
3) At the base position in cycle driving, If the selector switch is changed from automatic to manual, It will be all stopped condition.
   *Only when oil pressure pump is stopped
   If it is operated with manual, it shall be re-pushed the button for ready to start.
4) At the manual mode, when oil pressure pump is driving, if the selector will be changed to automatic, it will be followings.
   ①At the all parts are base position, It will be all stop condition if the button for cycle start are NOT pushed within certain seconds.
   ②At the parts are not base position, oil pressure motor will keep driving.

Out of scope

5) The equipments that have to keep the pressure anytime.

4.Moter control for oil pressure pump (For independent equipments)

1) When the button for ready to start is pushed, Motor for oil pressure pump will be driving.
Depends on the condition, it will be followings.

①Selector switch : Automatic

a) It's not in all parts are base position ; The motor for oil pressure pump will be driving.

b) It's in all parts are base position, It will be all stop condition if the button for cycle start is Not pushed within certain seconds.

②Selector switch : Manual

Motor for oil pressure keeps driving.

Out of scope

2) The equipments that have to keep the pressure anytime.

~~5.クーラントポンプの電動機制御~~

~~1) 油圧ポンプ用電動機と同時起動、停止を行う。~~

~~2) 機械本体、ワーク等の冷却を必要とする設備のクーラントポンプについては、適用除外とする。~~

~~6.チップコンベア~~

~~1) チップコンベアに関しては、間欠運動を行うと、災害の発生又は、設備故障の原因となる要素が多いため、原則として適用除外(回転継続)とする。~~

7.Electric control for conveyer

The conveyer controls like followings are desirable.

1) Accumulate, Rollerfright type conveyer

Entrance side	Exit side	Control
Work exist	Work exist	Stop after certain times
Work exist	No work	Working
No work	Work exist	Stop after certain times
No work	No work	Stop after certain times

* Entrance side : On the conveyer or final station from previous machine
(If the conveyers are not working, the works are putted into the machine compulsory.)

* Exit side : On the conveyer or the first station of next process
(If the conveyers are not working, the works are get out to next station compulsory.)

* The limit switches that written before are used to control the machine or conveyer.
If these power supplying are separately, limit switch has to have each equipment.

2) Go-Stop conveyer

①Basically, when the work exist at the entrance of the machine, the conveyer shall drive 1 pitch. (Except a manual carrying machine)

②The moving of conveyer are usually stop.

3) Condition shall be same with 3-(2) and if it is out of the condition, it will be re-start automatically after certain times.

8.Oter electric control

1) Basically, Other motor for washing pump, dust collector and conveyer shall be working only when it's needed. And the way to control shall be followed the way of control for oil pressure pump.

解説 Out of Scope

1. ~~本基準は、Ｓ６１．１．２３に設備分科会にて定め、仮登録されていたものを機械加工分科会で見直しを行い、正式に制定登録したものである。~~
2. ~~主に機械加工工場の設備に該当する。~~
3. ~~ＦＴＬ及び加工セル等の設備導入に当たり、本基準を見直し、改訂を行った。~~

Out of Scope

~~［配　布　先］~~　　~~＊印 特別配布~~

~~Ｊ１Ｄ~~
~~Ｅ４１~~

~~制　　定　：　１９８７年　６月　５日~~　　~~日産ディーゼル工業（株）ＤＥＭ委員会~~
~~改　　定　：　１９９７年　６月　２日~~　　~~ユニット分科会 分科会長：原田 忠禮~~

~~審議分科会　：ユニット分科会~~

~~専門委員会　：ユニット専門委員会~~

~~分科会委員　：金子 正孝(Ｊ１Ｂ)~~
~~安藤　俊彦(Ｊ１Ｂ)~~

~~分科会事務局：斎　藤　優　(Ｊ１Ｂ)~~

~~この基準に意見または質問があれば、Ｊ１Ｂへ連絡して下さい。~~