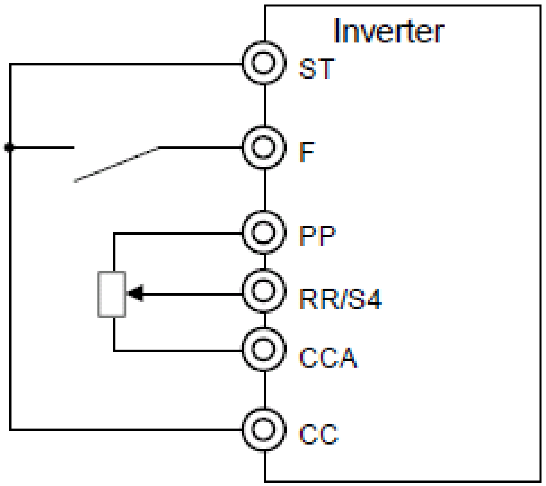
VF-AS1

Analog input My function

The control panel is usually used to set parameters, but the analog input My function allows specific parameters and functions to be set continuously using an external control device.

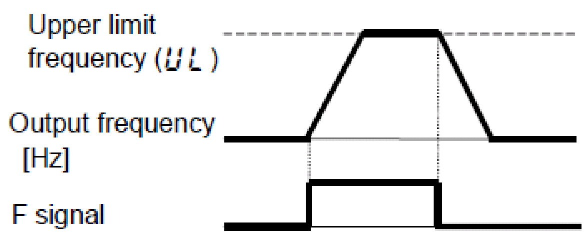
The figure below illustrates an inverter that sets the upper-limit frequency (UL) by means of analog signals.



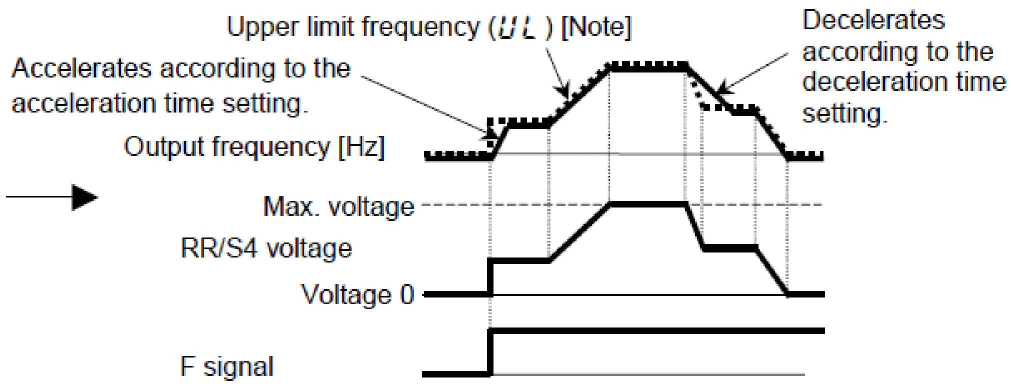
<Standard>

Upper limit frequency (UL) = 60Hz

Frequency setting = 60Hz



<Analog input My function>



Note: Adjustments are made by the inverter itself, so no changes are made to parameter settings.

The acceleration and deceleration time can be adjusted by changing the analog input value to the RR/S4 terminal. The analog input My function is applicable to the 9 objects in F961 and F964 (object for which analog function is used) of the table below. Terminals to which the analog input My function is assigned can be specified with the parameters F959 and F962 (object to which analog input function is assigned).

Title	Function	Adjustment range	Default setting
F959	Analog input function target 11	0: Deselect 1: VI/II 2: RR/S4 3: RX 4: Optional AI1+, Optional AI1- 5: Optional AI2	0
F961	Analog function assigned object 11	0: Disabled 1: Acceleration rate 2: Upper limit frequency (UL) 3: Acceleration multiplication factor 4: Deceleration multiplication factor 5: Manual torque boost (vb) 6: OC stall (F601) 7: Thermal protection (tHr) 8: Speed loop P gain (F460) 9: Drooping gain (F320) 10: PID P gain (F362)	0
F962	Analog input function target 21	Same as F959	0
F964	Analog function assigned object 21	Same as F961	0

The analog input My function can be set in two ways.
If the analog input value specified with F959 is set so as to vary from 0 to the maximum value, the parameter for the object selected with F961 can be adjusted within a range of 0 to parameter setting * variable factor. The same goes for F962 and F964.
This analog value adjustment range can be adjusted by changing input points (F201 to F203, AIF2, F212 to F231, and AvF2) and the maximum frequency setting.
To be more specific, if the analog input voltage varies from 0 to 10V, the value set with the parameter F961 changes by a factor of:

$$\frac{F1}{FH} \quad \text{to} \quad \frac{F2}{FH}$$

Where, FH is the maximum frequency (Hz), F1 is the frequency (Hz) at 0V, and F2 is the frequency (Hz) at 10V.

Option 1: Acceleration/deceleration rate

This option allows the acceleration/deceleration rate to change in proportion to the analog input value.

An example of using the RR/S4 terminal is given below.

FH =80 (Sets the maximum frequency at 80Hz.)
F959=2 (Selects the RR/S4 terminal.)
F961=1 (Selects acceleration/deceleration rate.)
F210=0 (Selects 0%.)
F211=20.0 (Selects 20Hz.)

F212=100 (Selects 100%)
AuF2=80.0 (Selects 80Hz.)

0V acceleration/deceleration rate = $\dfrac{20\ (\text{Hz})}{80\ (\text{Hz})} = 0.25$

10V acceleration/deceleration rate = $\dfrac{80\ (\text{Hz})}{80\ (\text{Hz})} = 1.00$

If the RR/S4 input value varies from 0 to the maximum value, the acceleration/deceleration rate changes by a factor of 0.25 to 1.

Note: A decrease in acceleration/deceleration rate by a factor of 0.25 means that the time elapsing before the completion of acceleration or deceleration increases by a factor of 4.

Option 2: Upper-limit frequency (UL)

This option allows the upper-limit frequency (UL) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 2 (upper-limit frequency), the upper-limit frequency set with the parameter UL changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 3: Acceleration multiplication factor

The acceleration time is determined by multiplying acceleration time 1 to acceleration time 4 (ACC, F500, F510 and F514) by the factor that varies with the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 3 (acceleration multiplication factor (ACC)), acceleration time 1 to acceleration time 4 set with the parameters ACC, F500, F510 and F514, respectively, change by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 4: Deceleration multiplication factor

The deceleration multiplication factor has the same function as the acceleration multiplication factor described above. It is used with deceleration time 1 to deceleration time 4 (dEC, F501, F511 and F515).

Option 5: Manual torque boost (ub)

This option allows the amount of boosted torque (ub) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 5 (manual torque boost (ub)), the amount of manually boosted torque ub changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 6: OC stall (F601)

This option allows the stall prevention level (F601) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 6 (OC stall (F601)), the OC stall value set with F601 changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 7: Electronic thermal (tHr)

This option allows the electronic thermal value (tHr) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 7 (electronic thermal (tHr)), the electronic thermal value set with the parameter tHr changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 8: Speed loop P gain (F460)

This option allows the speed loop P gain (F460) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 8 (speed loop P gain (F460)), the speed loop P gain set with F460 changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 9: Drooping gain (F320)

This option allows the droop gain (F320) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 9 (droop gain (F320)), the droop gain set with F320 changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).

Option 10: PID P gain (F362)

This option allows the PID P gain (F362) to change in proportion to the analog input value.

The settings to be made are the same as those for option 1: acceleration/deceleration rate. In this example, if F961 is set to 10 (PID P gain (F362)), the PID P gain set with F362 changes by a factor of 0.25 to 1 according to the RR/S4 input value (0 to maximum value).