Machine interface

# The feeder

The motor for the feeder turns a clam. With that motor turning clockwise the disc, which is on the surface in front of the clam, will be pushed off the surface and on to the conveyor belt. To make sure the engine runs clockwise the minus has to be connected to the connection closest to the spot where 6V is marked. We connect this engine to the 7th output of the pp2-processor.

# The position sensor

The way a position sensor is set up us by using a lens lamp and a phototransistor. The lens lamp will be shining in the direction of the phototransistor. The light from the lens lamp makes the phototransistor send a signal to the pp2-processor. If a disc comes in between the lens lamp and the phototransistor then there won’t shine any light at the phototransistor and thus it won’t send a signal to the pp2-processor. The phototransistor is connected to the 8th input of the pp2-board. The phototransistor is polarized and thus it is important that it is connected correctly. The correct way to connect is with the ground to the connection closest to the white spot on the phototransistor. The lens lamp isn’t polarized and does not move in any direction and thus it doesn’t matter in which connection the ground is. The lens lamp is connected to the 5th output of the pp2-processor.

# The black white detector

The black white detector uses the same components as the position sensor but they are implemented in a different way. The way in which the colour is detected is by the reflection of light on the disc. Because white discs reflect light very well the phototransistor does pick up some light and thus sends a signal. Black disc on the other hand do not reflect enough light to let the phototransistor pick it up. Thus a white disc can be detected if the sensors are placed in the correct way.

To make sure the phototransistor picks up only the reflected light a cap is placed over it with a hole in the middle. So only light from in front of it will influence the phototransistor. But to make sure that the reflected light can pass through that hole the sensor must placed at an angle. The reflected light, which is detected by the phototransistor, is at its strongest when the lens lamp is also placed at an angle.

We connected the lens lamp in the same way as the lens lamp of the position sensor only now to the 6th output of the pp2-processor. The phototransistor is also connected as described in the position sensor only now to the 7th inputs.

# The Sorter

The divider uses a so-called “H-bridge” to move up and down. We use out-x and out-y to control the H-bridge, which in turn controls the motor moving the divider. We connect the ground of the H bridge to he 9-side of the motor. Now when we power up out-x the divider will move up. When we power up out-y the divider will move down. Out-1 and out-2 are never allowed to be on at the same time, which is also stated in the safety properties. We want to move the divider as fast as possible so we always use the maximum allowed voltage of 9 volts. To detect when the divider is in its upmost position we use a push-sensor. When the PP2 detects that this push-sensor is pressed we immediately cut the power to out-x. We do not detect when the divider is at the bottom, we simply power on the motor for a set amount of time. This time should be enough to make it move to the bottom but not low enough too interfere with the conveyor belt.

# The buttons

The button that is used to start/stop the machine will be button 0. The button to abort the machine will be button 1.