Section 5.9
Automatic Pick Timing Controller (ATC)

5.9 Automatic Pick Timing Controller (ATC)

The automatic pick timing controller (ATC) automatically controls the electromagnetic pin (EDP) opening angles and the valve jet angles so that the actual weft arrival timing (Tw) approaches the target timing (Twi), while keeping wefts in the ideal picking state preset by [ICS].

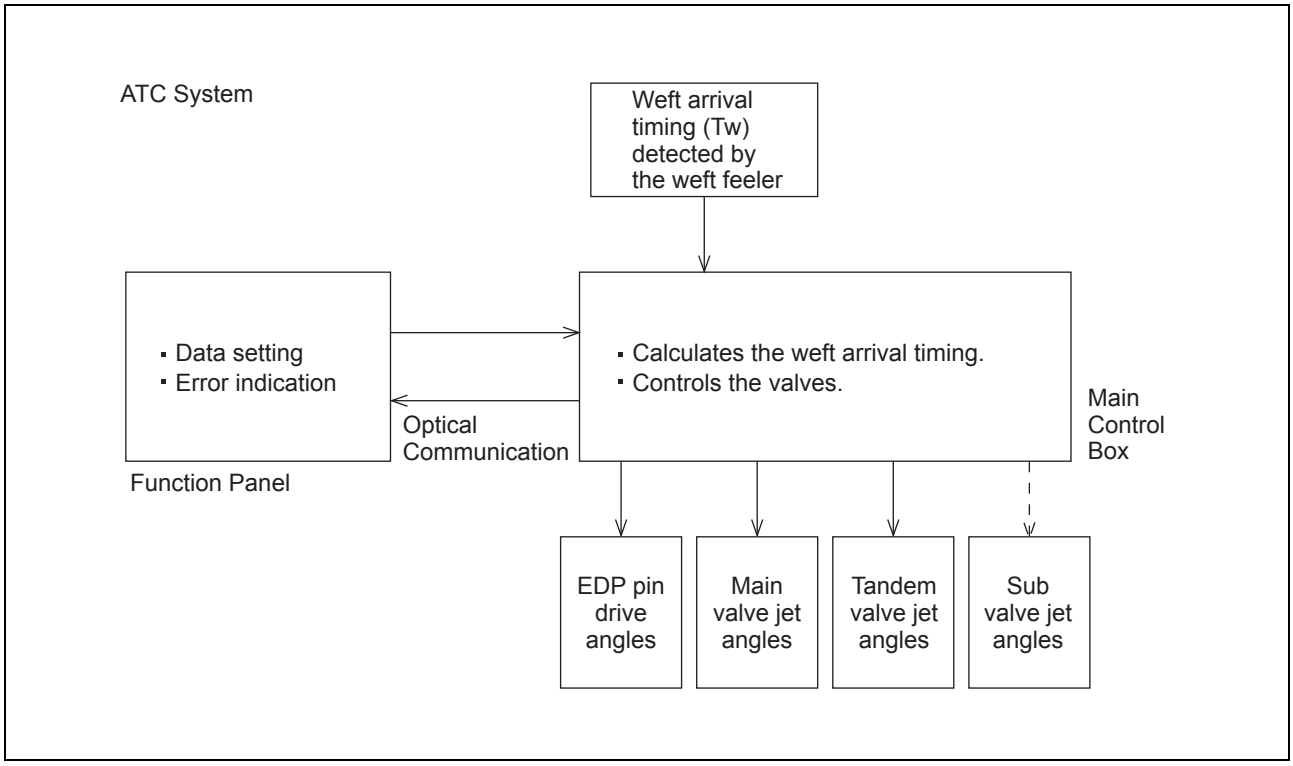
The ATC may operate on an average value basis and/or real-time basis (hereinafter called "ATC average control" and ATC realtime control," respectively).

The ATC average control works based on the average of the sampled picking states obtained by touching **Map**–**TWcrtl**–Setting. It automatically controls the jet starting (ON) angles of the main, tandem, rightward sub, and stretch valves while keeping their jet ending (OFF) angles fixed. For other sub valves, it controls the jet starting angles while keeping their jet ON-duration angles fixed.

In addition to the ATC average control, the ATC realtime control is newly added. It controls the jet ON-duration angles of the main, tandem and sub valves every pick according to the weft arrival angle on every pick. The jet starting angles of the main and sub valves are fixed.

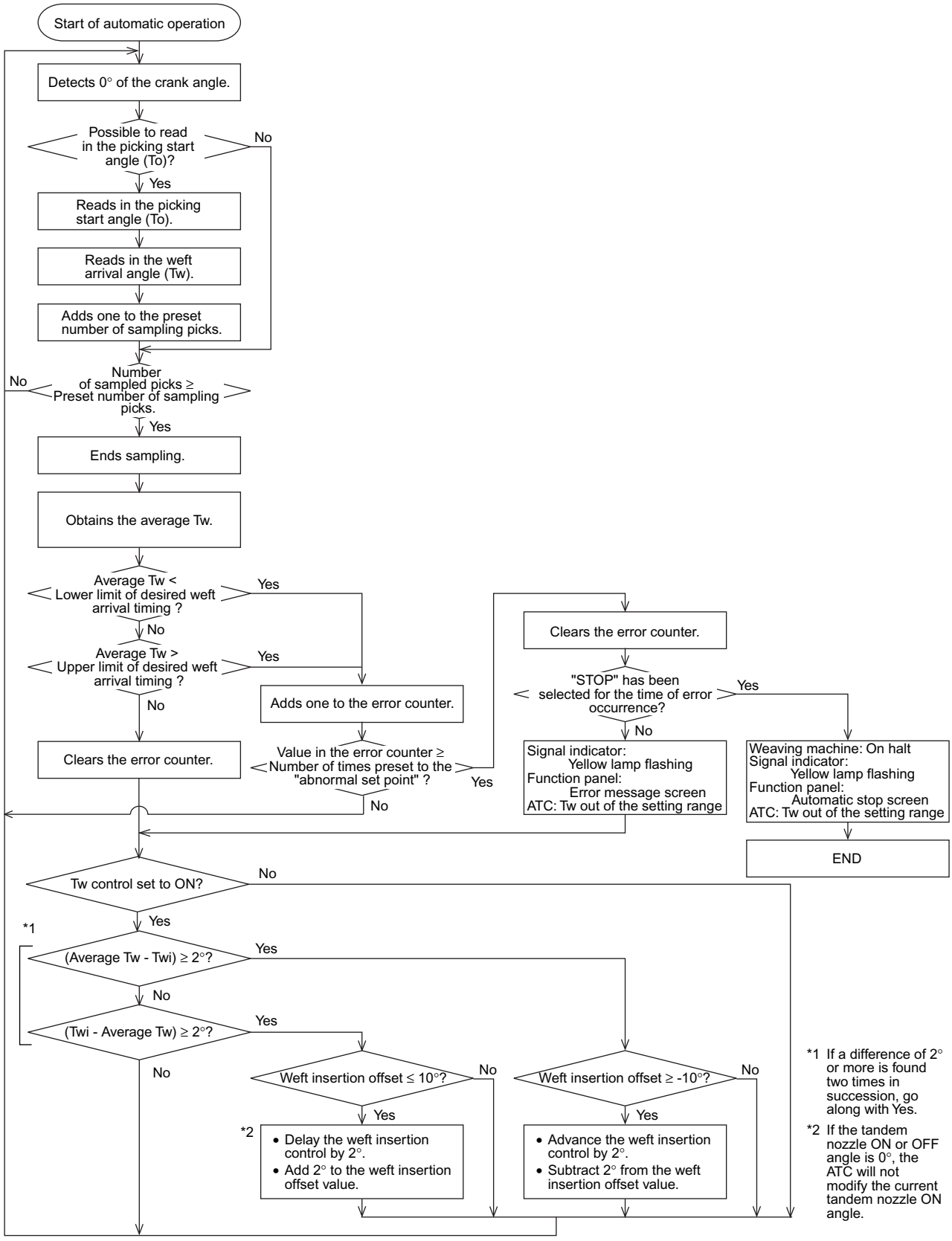
If both the average and realtime controls are selected at the same time, both of them will be enabled.

The ATC is provided as standard and installed also on the machines equipped with AFC, APC, APCII, or EPC. Selecting ON as the realtime control in EPCm version enables not only the realtime control but the Tw control with average values simultaneously.



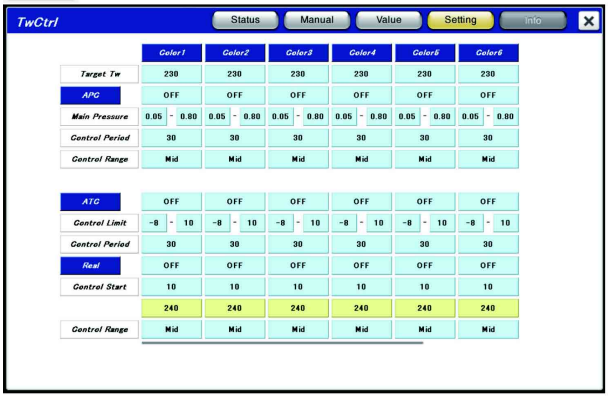
5.9.1 ATC Average Control

[1] Controlling the electromagnetic pin (EDP) opening angles and the jet starting (ON) angles of main (tandem) valves



*1 If a difference of 2° or more is found two times in succession, go along with Yes.

*2 If the tandem nozzle ON or OFF angle is 0°, the ATC will not modify the current tandem nozzle ON angle.



5.9.2 Setting ATC-related Conditions on the Function Panel

Choose [Map] - [TWCtrl] - [Setting] for ATC-related setting.
The figure displays the case including AFC specifications, however, in the case of specifications of ATC only, the column of AFC is not displayed.

[1] ATC

- ATC
  When this control is set to ON, the electromagnetic pin and valve timing controls Tw.
  When Tw control of AFC, etc. is ON, this is used with OFF.
- Control range
  Set the allowable range of the electromagnetic pin (EDP) drive timing for controlling Tw.
  This range should be set to the extent that no weft will catch on warp at the entrance of shed.
  However, set an upper limit angle as follows when there is Tw correction by ATC in the specifications with the automatic change of the number of revolutions (mainly towel specifications).
  The setting can be changed according to the difference of the rotation between the speed-up and slow-down.
  When the rotary scorer is 50 rpm, set it around 20 degrees.
  When the rotary scorer is 100 rpm, set it around 50 degrees.
  When the rotary scorer is 150 rpm, set it around 100 degrees.
  When the rotary scorer is 200 rpm, set it around 150 degrees.
  Normally, set it between -8° and 10°.
- Control cycle
  Set the number of sampling picks to be applied for taking the Tw average.
  Typical setting: 30 picks

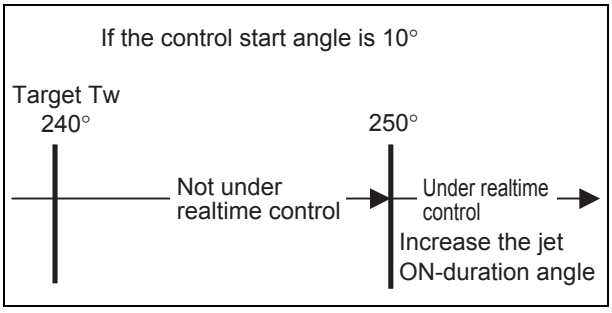
[2] REAL

- REAL
  If this control is set to ON, the ATC makes Tw approach its target (Twi) by increasing the jet ON-duration angle of the main, tandem and sub valves at the next pick when the current Tw is suddenly delayed.
- Control start
  If Tw is delayed by the angle specified here or more from the target Tw (shown by the **STANDARD** switch), then the ATC will work in realtime.

Typical setting: 10°
The value of target Tw+ control start angle is shown below the set value.

- Control range
  You can select the control range from among HIGH, MID and LOW. The initial value (standard) is MID.
  The realtime control adjusts the weft insertion timing when Tw is delayed, but the corrected Tw may become too fast depending on the weft yarn type. The standard deviation of Tw becomes greater when the realtime control is set to ON compared with the case when it is set to OFF.
  In such a case, change the control level from MID to LOW (or from HIGH to MID). If the standard deviation does not increase to be ineffective against weft loosening, change the control range from MID to HIGH (or from LOW to MID).

Reference: The standard deviation of Tw can be checked on the INFO screen.



The concept of the ATC realtime control is illustrated at left.

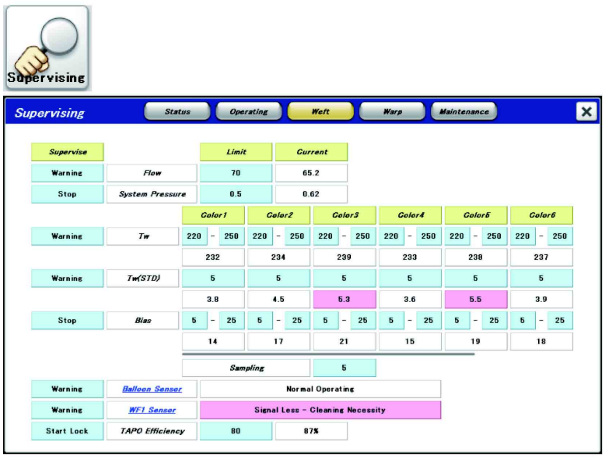
The ATC monitors every Tw. If Tw is delayed from the control start angle, the ATC will increase the jet ON-duration angle of the main and sub valves. If no Tw delay is found, the ATC will gradually decrease the jet ON-duration angle to the preset value.

The realtime control is useful when Tw changes rapidly and greatly and weft miss occurs frequently.

[3] Warning function

This can be set on the screen via [Map] – [Function] – [Monitoring] – [Weft].

- Tw
  When Tw exceeds the range specified, ATC issues a warning or makes the machine stop.
- Tw (Standard deviation)
  When the standard deviation of Tw exceeds the designated value, ATC issues a warning or makes the machine stop.
- Bias angle
  When the bias angle (difference of Tw and Tbw) exceeds the designated range, ATC issues a warning or makes the machine stop.



5.9.3 ATC Adjustment Flow

Before actually using the ATC, follow the flowchart given below.