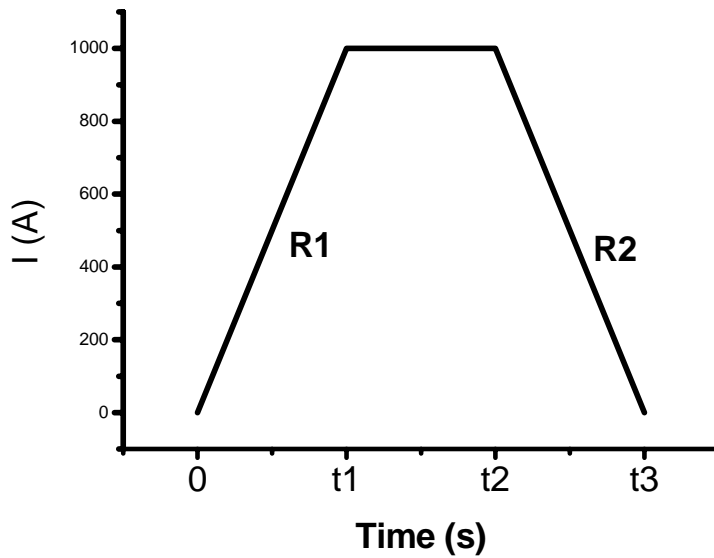


# EAST Magnet Charging Waveform

Translated by Bingjia Xiao, March 7, 2006



Notations:

QP: Quench Protection

QPA: Quench protection action

JRM: Joint resistance measurement

MM: Magnetic Measurement

| Seq.  | Coil(s)                 | t1(s)  | t2     | t3     | R1(A/s) | R2    | Puprpose | Notice to PS |
|-------|-------------------------|--------|--------|--------|---------|-------|----------|--------------|
| 1     | TF                      | 200    | 210    | 410    | 5       | -5    | QP       | No QPA       |
| 2     | TF                      | 400    | 880    | 1280   | 5       | -5    | QP, JRM  |              |
| 3     | PF3                     | 20     | 25     | 45     | 50      | -50   | QP,      | No QPA       |
| 4     | PF3                     | 10     | 70     | 80     | 200     | -200  | QP, JRM  |              |
| 5     | PF3                     | 0.5    | 3.5    | 4      | 2000    | -2000 | MM       |              |
| 6     | PF3                     | 1      | 4      | 5      | 2000    | -2000 | MM       |              |
| 7-10  | Repeat 3-6 for PF4 only |        |        |        |         |       |          |              |
| 11-14 | Repeat 3-6 for PF5 only |        |        |        |         |       |          |              |
| 15-18 | Repeat 3-6 for PF6 only |        |        |        |         |       |          |              |
| 19    | PF3-4                   | 20     | 50     | 70     | 100     | -100  | QP       |              |
| 20    | PF3-5                   | 20     | 50     | 70     | 100     | -100  | QP       |              |
| 21    | TF                      | 400    | 520    | 920    | 5       | -5    | QP       |              |
|       | PF3-6 <sup>1</sup>      | 400+20 | 400+50 | 400+70 | 100     | -100  | QP       |              |
| 22    | PF8+10                  | 20     | 25     | 45     | 50      | -50   | QP       | No QPA       |
| 23    | PF8+10                  | 10     | 70     | 80     | 200     | -200  | QP, JRM  |              |
| 24    | PF8+10                  | 1      | 4      | 5      | 1000    | -1000 | MM       |              |
| 25    | Repeat 24               |        |        |        |         |       |          |              |

<sup>1</sup> PF 3 to 6 start to charge when TF reaches flattop at  $t=400$  s

|       |  |     |     |    |      |       |         |        |  |
|-------|--|-----|-----|----|------|-------|---------|--------|--|
| 26    | PF8+10   | 2   | 5   | 7  | 1000 | -1000 | MM      |        |  |
| 27    | Repeat 26  |     |     |    |      |       |         |        |  |
| 28    | PF13   | 20  | 25  | 45 | 50   | -50   | QP      | No QPA |  |
| 29    | PF13   | 10  | 70  | 80 | 200  | -200  | QP, JRM |        |  |
| 30    | PF13   | 0.5 | 3.5 | 4  | 2000 | -2000 | MM      |        |  |
| 31    | PF13   | 1   | 4   | 5  | 2000 | -2000 | MM      |        |  |
| 32-35 | Repeat 28-31 for PF11 only.                            |     |     |    |      |       |         |        |  |
| 36-39 | Repeat 28-31 for PF2 only                              |     |     |    |      |       |         |        |  |
| 40    | PF2,8+10   | 20  | 50  | 70 | 100  | -100  | QP      |        |  |
| 41    | PF11,13  | 20  | 50  | 70 | 100  | -100  | QP      |        |  |
| 42    | PF8+10,<br>11,13                                       | 20  | 50  | 70 | 100  | -100  | QP      |        |  |
| 43    | PF2,<br>8+10,<br>11,13                                 | 20  | 50  | 70 | 100  | -100  | QP      |        |  |
| 44    | PF7+9  | 20  | 25  | 45 | 50   | -50   | QP      | No QPA |  |
| 45    | PF7+9  | 10  | 70  | 80 | 200  | -200  | QP, JRM |        |  |
| 46    | PF7+9  | 1   | 4   | 5  | 1000 | -1000 | MM      |        |  |
| 47    | Repeat 46  |     |     |    |      |       |         |        |  |
| 48    | PF7+9  | 2   | 5   | 7  | 1000 | -1000 | MM      |        |  |
| 49    | Repeat 48  |     |     |    |      |       |         |        |  |
| 50    | PF12   | 20  | 25  | 45 | 50   | -50   | QP      | No QPA |  |
| 51    | PF12   | 10  | 70  | 80 | 200  | -200  | QP, JRM |        |  |
| 52    | PF12   | 0.5 | 3.5 | 4  | 2000 | -2000 | MM      |        |  |
| 53    | PF12   | 1   | 4   | 5  | 2000 | -2000 | MM      |        |  |
| 54-57 | Repeat 50-53 for PF12 only?????? PF14?                 |     |     |    |      |       |         |        |  |
| 58-61 | Repeat 50-53 for PF1 only                              |     |     |    |      |       |         |        |  |
| 62    | PF7+9, 1   | 20  | 50  | 70 | 100  | -100  | QP      |        |  |
| 63    | Repeat 62 for PF12 and 14 at the same time             |     |     |    |      |       |         |        |  |
| 64    | Repeat 62 for PF12, 14 and PF7+9 at the same time      |     |     |    |      |       |         |        |  |
| 65    | Repeat 62 for PF12,14,7+9 and 1 at the same time       |     |     |    |      |       |         |        |  |
| 66    | PF7+9A <sup>2</sup><br>PF8+10A                         | 2   | 5   | 7  | 500  | -500  | MM      |        |  |
| 67    | PF7+9A<br>PF8+10A                                      | 4   | 7   | 11 | 500  | -500  | MM      |        |  |
| 68    | PF13,<br>14A   | 1   | 4   | 5  | 1000 | -1000 | MM      |        |  |
| 69    | PF13,<br>14A   | 2   | 5   | 7  | 1000 | -1000 | MM      |        |  |
| 70-71 | Repeat 68-69 for PF11 and 12 in anti-series connection |     |     |    |      |       |         | MM     |  |
| 72-73 | Repeat 68-69 for PF 1 and 2 in anti-series connection  |     |     |    |      |       |         | MM     |  |

<sup>2</sup> PF7+9A means PF7 and 9 are in anti-series

|       |   |  |    |    |      |       |    |    |
|-------|---|--|----|----|------|-------|----|----|
| 74-75 | Repeat 68-69 for PF 3 and 4 in anti-series connection |  |    |    |      |       |    | MM |
| 76-77 | Repeat 68-69 for PF 5 and 6 in anti-series connection |  |    |    |      |       |    | MM |
| 78    | PF7+9<br>PF8+10                                       | 2  | 5  | 7  | 500  | -500  | MM |    |
| 79    | PF7+9<br>PF8+10                                       | 4  | 7  | 11 | 500  | -500  | MM |    |
| 80    | PF13+14   | 1  | 4  | 5  | 1000 | -1000 | MM |    |
| 81    | PF13+14   | 2  | 5  | 7  | 1000 | -1000 | MM |    |
| 82-83 | Repeat 80-81 for PF 11 and 12 in series connection    |  |    |    |      |       |    | MM |
| 84-85 | Repeat 80-81 for PF 1 and 2 in series connection      |  |    |    |      |       |    | MM |
| 86-87 | Repeat 80-81 for PF3 and 4 in series connection       |  |    |    |      |       |    | MM |
| 88-89 | Repeat 80-81 for PF5 and 6 in series connection       |  |    |    |      |       |    | MM |
| 90    | TF  | 10   | 13 | 23 | 100  | -100  | MM |    |
| 91    | TF  | 20   | 23 | 43 | 100  | -100  | MM |    |
| 92    | TF  | Repeat 90-91 for TF coil currents in reverse direction |    |    |      |       |    |    |

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for TF charging simulation and measure the joint resistance at the same time

